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The OIL WEEKLY and The COMPOSITE CATALOG for the drilling-producing-pipeline industry

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THE OIL WEEKLY

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LOOKING AHEAD
... with the Editor

EDGING of the federal government into the oil business through its mineral-rights policy on lands acquired under various agencies and departments has become a matter of concern to the industry. Actual participation so far is slight, but could easily become large.

Next week will appear the first of two articles on this subject. The first will deal with the activities of the Department of Agriculture, while the second will discuss operations of the Department of the Interior. These are the two largest land-owning departments of the government.

THE OIL MAN'S CALENDAR

JUNE 24	Kentucky Oil and Gas Association, Mid-Year Meeting, Hotel Lafayette, Lexington.
30 and JULY 1	Interstate Oil Compact Commission Quarterly Meeting, Shirley-Savoy Hotel, Denver, Colorado.
OCT. 3- 4	American Association of Oil Well Drilling Contractors, Blackstone Hotel, Fort Worth.
12-13	Texas Mid-Continent Oil & Gas Association, Houston.
23-25	Fifteenth Annual Meeting, IPA, Dallas, Texas.
NOV. 13-16	American Petroleum Institute, Stevens Hotel, Chicago.

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The Changing Panorama

Another War Baby With Possibilities

ONE of the important invasion vehicles expected to find an important part to play after the return of peace is the "Water Buffalo," amphibious tank known to the military as an LVT (Landing Vehicle, Tracked). It is equally at home on land or sea, using its cup-like tread to climb over underwater obstacles that would stop a boat and to move freely through mud or sand that would prove impassable to trucks.

Strangely enough, the LVT was developed in its original form during peacetime, with the idea of rescuing people stranded during floods and hurricanes. The army soon took it over and has made many improvements, which are expected to increase its peacetime use.

Manufacturers see in it a vehicle of value to those operating, or searching for, oil properties in swamp or lake country as well as in sandy or rugged areas. They could be used to transport supplies and personnel as well as carrying geophysical crews to points hitherto inaccessible by present methods.

The first models, since improved, could carry 220 armed men, haul a cargo of 4000 pounds, with overall weight of 17,500 pounds. A peacetime model would need no armor or armament and consequent reduction in weight would increase carrying capacity and speed.

Gas Chemistry Prospects Bright

THE role of gas chemistry in forming the basis for new industries and jobs after the war ends is bound to be an important one. Natural gas is among our most common natural resources, being found in 37 of the 48 states. Much of the progress of the war program can be attributed to achievements of gas chemistry. New developments applied to peacetime industry, with further advances yet to come, are likely to bring the whole natural-gas industry into a completely new prominence in the national economy.

"In peacetime a 42-gallon barrel of crude yielded some 18 gallons of automotive gasoline and one half gallon of aviation fuel. Today, that 18 is reduced to 11½ gallons of automotive gasoline to make way for aviation gasoline, toluene, TNT, butadiene, and increased amounts of fuel oil for heat and power. The difference between 18 and 11½, or 6½ are the gallons that have gone to war."

—RALPH K. DAVIES, Deputy PAW Administrator.

Bailey Mentioned To Succeed Knowlton

PROMINENT among those mentioned last week as probable successor to Don R. Knowlton, recently resigned as director of production for PAW, was the name of O. C. Bailey, chairman of the Arkansas Oil & Gas Commission. Whether or not Bailey has been offered the post or whether he will accept, of course, is not known, but the industry feels that he has done a good job with the Arkansas commission and his possible appointment is viewed with no disfavor.

Sees Solution for New Rubber Plants

WHAT to do with United States' quick growth of synthetic-rubber manufacturing plants, come peace and a cessation of military demands, is no problem, at least that's the opinion of Rubber Director Bradley Dewey who thinks this Johnny Come-Lately in America's industrial family will survive the war in robust condition and will provide employment "for generations."

World demand for rubber due to the almost certain industrialization of South America, China, Russia, India and other nations is the basis for Dewey's reasoning. Such intensive and extensive industrialization will create a demand for rubber far beyond the capacity of natural-rubber plantations, he believes.

If the director is right in his reasoning, then Uncle Sam's postwar economy should be relieved of one large-sized headache. Would that all of our war surplus problems might be solved as easily!

Atmosphere Cleared By Davies' Visit

RALPH K. DAVIES, deputy administrator of PAW, accompanied by a large part of his staff, came to Houston last week for a long-deferred conference between PAW tops and oil producers—a conference which PAW officials had evidently anticipated with somewhat the same feeling that a buck views the approaching hunting season. Davies and his staff departed after the conference with an entirely different feeling and, we hope, with a new appreciation that the oil country joins the PAW staff fully in its desire to help win the war with oil. The occasion of the conference was a desire on the part of operators to modify certain PAW regulations and Davies, following a morning of speeches, including presentation of a well-defined set of suggestions from the District 3 Production Committee, brought prolonged applause by the statement that the suggestions would be reviewed under a sympathetic light on his return to Washington.

The pity is that it was necessary for Davies and his staff to travel to Houston to find out that the complaints originating in District 3 were the result of some serious thinking on the part of operators who daily grapple with the problems of helping to meet the nation's need for petroleum under the direction of the PAW. The speeches made at the conference by representatives from the oil country were not acrimonious, and the proposals of the District 3 Production Committee were couched in the friendliest terms. Davies met this spirit with an attitude of equal friendliness and the meeting almost wound up in a mutual bouquet-tossing contest.

W. R. Boyd, Jr. of PIWC did indulge in a lecture to the "boys" on the subject of "grandstand quarterbacks," an attitude not unique among some who spend a great deal of their time in Washington, and possibly an attitude which has some points to commend it, although it was pointed out after the meeting, the "grandstand quarterbacks" usually include those whose purchase of tickets makes the game possible.

Several of the oil industry speakers dwelt on the difficulties daily faced by

"I have been amazed at the speed your tanks are erected and by the care with which you have solved the difficult points of joining the elements".

Writes the French Capitaine *from Algeria*

THE WORDS of the French Capitaine echo the praise of Columbian Bolted Steel Tank by fighting men on every battle front of the United Nations. On burning deserts . . . Arctic wastes . . . and island outposts, Columbian Bolted Steel Tanks store vital liquids of war. Well known to the oil industry as a dependable, economical means of storing oil, gasoline, water and other liquids, *these famous tanks are available to you now.*

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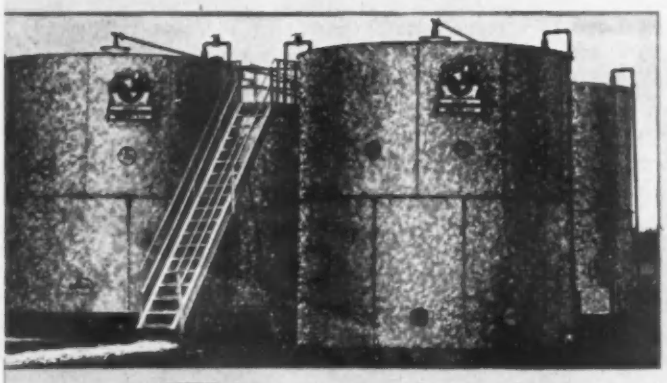

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In any case it will be necessary to build new tanks as soon as possible.

I have been amazed by the speed at which your tanks can be erected and by the care with which you have solved the difficult points of joining the elements.

I should be glad if you could send me catalogs and instructions concerning these tanks in order that I shall be able to write you and lay down [illegible] you what we [illegible] as soon as we [illegible]

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PAW officials—difficulties which are very real and which involve not only half-baked criticisms from the industry itself, but difficulties laid in the path of PAW by those either not friendly to the oil industry or those ignorant of its problems.

Davies expressed implicit confidence in the intention of Administrator Ickes to help return the oil business to the oil industry when the war is over and reiterated his own strong feelings along this line.

The general feeling expressed by those who attended the conference was that it helped materially to clear an atmosphere which really needed clearing, and that if the proposals put forward by District 3 Production Committee are acted upon favorably by PAW, the war effort will be materially helped.

More Carbon Black Ups Sour Gas Demand

RISING demand, largely from synthetic-rubber plants, continues to reduce the supply of carbon black. The situation, fast becoming critical, will necessitate construction of additional black plants, which will increase consumption of sour gas.

Carbon black consumption currently is running around 70 million pounds monthly, 100 percent above a year ago. At the end of May, stocks of carbon black used in rubber processing approximated 130 million pounds, or less than two months supply as compared with a six-month inventory a year ago.

New pipe-line facilities are expected to provide a larger sour-gas supply for Texas Panhandle plants. In addition, WPB plans to approve construction of several carbon plants in West Texas and New Mexico, perhaps 20 million pounds monthly capacity. Some of these will come into production late in 1944 or early 1945, when the black situation will be extremely tight. Plants may also be constructed in foreign countries. WPB is said to have suggested plant construction in Iran and Russia, and the prospects in these countries are understood to be under study now.

"It takes 3 tons of gas to 'deliver' a 1-ton bomb!"

"Over half the total of all supplies shipped to the front is petroleum in one form or another."

"Oil for one fueling of a battleship would heat an average house for 350 years!"

From The Petroleum Industry's Part in the Gasoline Conservation Drive, PIWC.

And the Rigs Go Traveling On!

WE read that from New Zealand three rigs are to be shipped to Alaska for governmental operations . . . at least we assume that the government will handle the operations. Which brings to mind a good story about these three rigs. Not long after the United States entered the war an American operator desired to drill some wildcat locations in New Zealand on leases which had been acquired sometime before the war. He wanted to move a rig to New Zealand to drill these three wells. The Army figured that if one rig was a good thing, three rigs would be better so three rigs were shipped so that the wildcats could be drilled simultaneously. Three dry holes resulted.

So now the rigs are to resume their international travels, coming back to the Western Hemisphere. There were some who evidenced mild astonishment at the idea of the Army that three complete rigs should be shipped to New Zealand to drill three wildcat holes, and now there is also astonishment that these rigs should be shipped to Alaska when it is known that there will be plenty of work for them in New Guinea when we take that area from the Japs.

The Auto Industry And Postwar Jobs

JOBS for ten million people can be provided by the automobile industry when the war ends if, in its first years of unrestricted production, it builds the approximately 6,000,000 units some predict.

Ward. M. Canady, president of Willys-Overland Motors, in justifying this, his prediction, pointed out that ten million is nearly a fourth as many jobs as all industry ever provided in the country's busiest prewar year. He explained that this figure is based partly on the fact that in 1939, the automobile business, as the keystone of America's job structure, was responsible for employment of approximately 6,700,000 persons while building 3,577,292 passenger cars and trucks.

Jobs included in the estimate cover the following fields: manufacture of autos, trucks, parts and tires; petroleum refining, sales and service, building and maintenance of federal and state roads, truck, taxi and bus driving, work directly concerned with the manufacture of raw materials earmarked for the industry, and auto insurance and finance company positions.

Thousands of other jobs may be created indirectly by auto manufacturers in a wide number of enterprises such as the tourist and resort business. The "jeep" alone, the automobile executive said, will add a new motorized medium of employment that can supply thousands of jobs.

Venezuela Attracting Many New Companies

TODAY in Caracas, Venezuela, one will find representatives of many more oil companies than ever before. These comparatively new arrivals represent not only the larger oil companies not previously in Venezuela, but also several substantial smaller concerns. They are seeking oil concessions.

There are two reasons why so many oil companies are trying to obtain oil concessions in Venezuela, according to Gerald H. Westby, president of Seismograph Service Corporation, of Tulsa, in speaking before the Gulf Coast Section of the American Institute of Mining and Metallurgical Engineers in Houston on June 12. Westby outlined these two reasons as follows:

1. The declining discovery rate in the United States, which is causing them to seek more fertile finding areas.

2. The more favorable tax rate on corporate earnings that exists in Venezuela today. Westby pointed out that the maximum tax rate on business earnings in Venezuela did not exceed 24 percent, compared with the 90 percent tax bracket on large earnings in the United States.

Elk Hills Plan Seems Sound One

NEEDING only the presidential signature, the bill finally allowing Elk Hills in California to do its part in the war has passed both branches of the Congress. As the bill has been passed it allows Elk Hills to do its part in furnishing badly needed oil in California, and the operation plan seems to be a sound one. We are told that there have been times when Elk Hills has come dangerously close to being the first governmental effort in the oil producing business in the United States. But as things now stand, Elk Hills will be operated by private elements of the oil industry with a multitude of controls, both on the operators and on the Navy. We are glad that the matter has been so settled.

A sure move in cutting pump trouble to a minimum--

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At left, D+B Stationery Type Challenger "B" Pump with Bottom Cup Hold-Down.

At right, D+B Stationery Type Full-Seal "B" Pump with Top Cup Hold-Down.

It's an old axiom of physics that for every effect there's a cause. When the deep-well plunger pumps on your lease give trouble that's the effect, and sometimes it's difficult to eliminate the cause. Deep-well plunger pumps have many parts and like the links in a chain none is stronger than the weakest.

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OIL WELL

PUMPS

WASHINGTON ROUNDUP

By BERTRAM F. LINZ, Washington Correspondent

OIL developments in Washington last week were confined largely to the Capitol, where petroleum questions came up in both Senate and House.

Price Increase Rejected—The outstanding event of the week was the about-face by the House on the question of forcing the Office of Price Administration to raise the ceiling on crude oil when, after having adopted an amendment to the bill extending the life of the Emergency Price Control Act which would have provided a general increase of 35 cents a barrel, it tossed the provision out before sending the bill to conference.

Elk Hills Bill Passed—The final chapter in the controversy over the Navy's contract with Standard Oil Company of California for development of the Elk Hills field was written when the senate passed and sent to the White House the Vinson Bill stipulating the principles to be incorporated in the agreement and the accompanying resolution authorizing the production of 65,000 barrels of oil daily from Naval Reserve No. 1.

PAW Funds Approved—The Senate also disposed of PAW's appropriation for the coming fiscal year, approving the $6,000,000 voted by the House.

Oil Hearings Postponed—Another nail was driven in the coffin of Petroleum Reserve Corporation's Saudi Arabian pipe line project when the special Senate oil committee, expressing assurance that there would be no new developments for some time to come, announced postponement until next fall of public hearings on that and other phases of the world oil situation.

Last-Minute Action by the House Blocks General Oil Price Increase

The oil industry last week almost got its general price increase, but last-minute action by the House in passing legislation to extend the life of the emergency price control act wiped out an amendment which Representative Wesley E. Disney of Oklahoma had earlier succeeded in having incorporated in the measure.

After adopting the Disney amendment on June 10, the House on June 14 killed it by a vote of 204 to 178 on a roll-call demanded after a division had indicated its approval by 141 to 139.

In addition to the oil provision, the House also killed a Senate-approved cotton-stabilization plan. Inclusion of these two amendments would have meant certain veto of the legislation by President Roosevelt.

While the administration won a victory on oil and cotton, it failed to stem the tide of amendments which various interests in the House pressed to adoption. Most of these, however, are expected to come out of the bill in conference.

With the congressional fight for an oil increase terminated, Stabilization Director Fred M. Vinson is expected promptly to announce his approval of the OPA plan for a sliding-scale price increase for stripper-well and high-cost operators.

The Senate, by a vote of 25 to 42, refused to adopt an amendment offered by Senator Thomas of Oklahoma to provide a ceiling price for crude not less than 90 percent of parity, but the House, by a vote of 123 to 57, agreed to Disney's amendment providing for a 35-cent increase. Debate in both houses criticized OPA policies and administration.

As the House loaded the bill with amendments, the administration fought bitterly to protect its anti-inflation program, and Price Administrator Chester Bowles sought to enlist public opinion, warning that "price chaos" would follow adoption of a bill so loaded with "legal booby traps". Bowles declared in a radio talk that "in your town" the Disney amendment "would raise the price you are now paying for gasoline, fuel oil and kerosine.

"If favored treatment were given to one industry," he asked, "could we fairly refuse to do it for others? If the increase proposed for petroleum were applied only to such basic items as aluminum, magnesium, lead, tin, electricity and rayon fabrics, the increase would run to five billion dollars."

The situation threatened at one time to stymie plans to recess Congress over the political conventions.

Gasoline Rationing to Continue at Least a Year

Gasoline rationing will continue until at least June 30, 1945, regardless of the ending of the war in Europe before that date, it was disclosed by Price Administrator Chester Bowles in testimony before a House appropriations sub-committee made public June 16.

Bowles, discussing his agency's appropriation for the coming fiscal year, told the sub-committee that it would not be possible to lift restrictions on the use of gasoline for another 12 months and warned that the black market is showing signs of picking up again.

An appropriation of $177,750,000 was approved by the committee for OPA operations, $4,502,000 less than budget estimates but $8,250,000 more than was provided for this year. The increased funds will permit employment of an additional 1239 enforcement agents to fight black market and other violations of price ceilings and rationing.

Saudi Arabia Pipe-Line Project Developments Not Likely Until Fall

The special Senate oil-investigating committee shut up shop for the summer last week, after Petroleum Reserve Corporation President Ickes reportedly advised that there was little likelihood of any early developments in the Saudi Arabia pipe line project.

Ickes appeared before the committee at ac closed session June 13, and the following day, after another executive meeting, Chairman Maloney said no public hearings would be held before fall.

Recent developments indicate that the pipe line may be built by the companies which hold the concessions, with or without a Reconstruction Finance Corporation loan.

Senator Maloney did not refer to last month's White House conference when an agreement was reached that due

notice would be given of the government's intent, but said in his statement:

"The Senate committee on petroleum resources has received satisfactory assurances that no contracts on foreign petroleum matters, such as the proposed trans-Arabian pipe line, will be made by the Petroleum Reserves Corporation without timely notice to the committee.

"Accordingly, the committee yesterday voted unanimously to defer public hearings pending the further conferences on petroleum between the governments of the Unitd States and the United Kingdom.

"The decision to postpone public hearings was reached after consultation with representatives of all of the executive departments concerned.

"The committee will continue its studies relating to recommendations to a national petroleum policy and has been assured that it will be kept fully advised by the executive departments of developments in foreign oil matters."

Secretary of Navy Warns Against Fuel Shortages

Conservation of all kinds of fuel has been ordered at all domestic naval shore establishments by Secretary of the Navy James Forrestal "because of the critical stortages brought on by increased requirements for industrial power, movements of increasing quantities to the expanding theatres of war, a decrease in production in some areas and, in some instances, insufficient transportation facilities."

Oil, gas and coal fuels alike must be used sparingly and efficiently, Forrestal said.

"On the Pacific Coast," he pointed out, "the demand for oil is much greater than the producing ability of the supplying oil-well areas. A critical supply situation already exists, and it is anticipated that it will become increasingly difficult to meet the deficit in actual wartime demands from outside sources.

"In the Appalachian area (New York, Pennsylvania, Maryland, Virginia, West Virginia and Eastern Ohio) the supply of natural gas is critical.

"Along the Atlantic Seaboard it is anticipated that during the next heating season the supply of screened or prepared sizes of bituminous and anthracite coal will be extremely short."

Gas Waste Curtailment Sought in Louisiana

Louisiana Conservation Commission received nominations for allowables at its hearing in New Orleans Thursday and announced that allowables for fields of the state would be set about June 23.

Commissioner J. L. McHugh asked that oil operators and officials of the state's minerals division meet to plan further curtailment of gas waste.

McHugh took under advisement application of Shell Oil Company to dually complete a well in the Gibson field, Terrebonne Parish. Application of Roland C. Kizer to unitize a tract in the University field, East Baton Rouge Parish, was continued. Hearing on a proposed unitization order for the Bayou Pigeon field, Iberia Parish, was postponed.

Senate Appropriation Group Gives Approval to Reduced PAW Figures

An appropriation of $6,000,000 granted by the House last month for operation of PAW during the fiscal year beginning July 1 was approved without change by the Senate appropriations committee June 12.

As a result, PAW will operate on $550,000 less than it originally asked for lost winter, and $60,000 less than it figured necessary in a revised estimate, but officials of the agency said the latter could readily be taken care of without interfering with any important activities.

The cut from the original request for $6,550,000 for operation during the fiscal year 1945 to the $6,000,000 carried in the bill presented to the House by its appropriations committee was made voluntarily by PAW when it was realized that it would be impossible to obtain adequate staff to carry out its original program. The only agency voluntarily to cut its estimates, PAW was commended by the committee.

It was explained that the original estimates were made up on February 1, when the manpower situation, while tight, was not as critical as it later became, and the amended estimate was prepared May 8, after the hearings before the appropriations subcommittee.

With the aviation-gasoline program almost completed, and all facilities due to be in full operation by early fall, a substantial reduction in the staff of the construction division was made possible, and large money savings also were accomplished in the office of the deputy administrator, in administration and in the distribution and marketing, foreign refining and the supply and transportation divisions. The only increase over the original estimate was in the division of public relations.

Work of the production division will be confined largely to obtaining new equipment required by alterations in refinery processes, and equipment for replacements, especially where the operating life of refining units has been prematurely reduced by strains of wartime production.

"Provided conditions of material and equipment supply remain at their present level," the budget bureau was told, "the reduced staff should be able to maintain the country's refineries in full and efficient operation.

"Relaxation of restrictions on the use of materials, brought about by the War Production Board, has made possible the easing of several PAW orders affecting the industry, and the administration of those orders. The effect of the increasing manpower shortage on the production of both materials and equipment is as yet unknown. Again, from time to time, the supply of various types of equipment becomes critical, at present there is an acute shortage, among other items, of gasoline engines and trucks. Similar shortages will doubtless continue to develop. Our estimates herein of needs are based on the assumption that present conditions will get no worse."

Line From Monroe Field Is Turned Down by FPC

The Federal Power Commission last week dismissed an application of the Memphis Natural Gas Company for authority to construct a 61-mile 18-inch natural gas pipe line in Arkansas and Mississippi, on the ground that the Monroe gas field from which the company is supplied is being over-produced and could not stand the contemplated additional drain of 21,000,000 cubit feet daily.

The commission pointed out that Louisiana authorities had testified that the remaining recoverable natural gas reserve of the field was approximately 2.1 trillion cubic feet, sufficient only to last approximately eight years at the January, 1944, rate of production.

FPC announced that a hearing for June 26 at Oklahoma City on applications of Consolidated Gas Utilities Corporation for construction of one mile of 4½-inch line in Rice County to Sterling, Kansas, and 3½ miles of 8⅝-inch line in Caddo County, Oklahoma. Abandonment of 1½ miles in Rice County also is sought.

Producers to Continue Fight for Higher Price

The independent oil producer is "bloody but unbowed" and will continue his fight for higher crude-oil prices, Ralph T. Zook, president of IPAA, declared in Tulsa following defeat of the Disney bill in Congress to increase the price of crude oil 35 cents a barrel.

"The decision by Congress to deny oil producers an adequate price for crude oil through legislation is a hard blow," Zook said. "The producer has told his story faithfully, honestly, and fearlessly to those having jurisdiction over prices, to the Congress and the public. He has supported his statements with facts that will hold up under the most severe analysis. He has not resorted to pressure nor joined with any pressure group to obtain what he is entitled to on merit alone. The public as well as the oil producer is the loser.

"The independent producer has survived because he never quits fighting when he knows he is right. He has never been more right than in this case and he will continue to fight for a fair and just price for crude oil. He may be delayed in obtaining it but he will not be defeated."

Eight More Tankers

Consummation of a contract for the construction of eight T-2SE-A1 tankers, to be built by Marinship Corporation, Sausalito, California, was announced June 12 by the Maritime Commission.

The tankers will be of 141,000-barrel capacity, like those built under the previous contract with the corporation, and are scheduled for delivery during May and June, 1945.

Standard Oil Company (New Jersey) Names Eugene Holman President

Eugene Holman has been elected president of Standard Oil Company (New Jersey), to succeed R. W. Gallagher who becomes board chairman, in an adjustment of personnel which also advanced four other members of the executive staffs of the company and its subsidiaries.

Frank W. Abrams, a director of Standard Oil Company (New Jersey) for a number of years, advanced to vice president.

Jay E. Crane, treasurer of Standard Oil Company (New Jersey) was made a director of that company.

Chester F. Smith, president of Standard Oil Company of New Jersey (Eastern refining subsidiary), resigned to become a director of Standard Oil Company (New Jersey).

M. J. Rathbone, president of Standard Oil Company of Louisiana, succeeds Smith as president of Standard Oil Company of New Jersey.

M. W. Boyer, former vice president, was advanced to president of Standard Oil Company of Louisiana.

Gallagher, who came to the parent company from East Ohio Gas Company in 1933, became chairman of the board in 1942 and was elected president in 1943 upon the death of W. S. Farish. He continues also as chairman of the executive committee.

Native of Texas

Holman, a native of San Angelo and a graduate of University of Texas, joined Humble Oil & Refining Company in 1919, after service in World War I and with the United States Geological Survey. He advanced to chief geologist for Humble Oil & Refining Company before going to New York in 1929 as assistant to E. J. Sadler, then vice president. He became an executive of several foreign operating subsidiaries of Standard Oil Company (New Jersey) and vice president of the parent company in 1942, and a member of the executive committee in 1943.

Crane came to the company in 1933 as assistant treasurer after being associated with the Federal Reserve Bank in New York since 1915. He has been treasurer since 1936.

Abrams has been a member of the board since 1940, having joined the company's refining division in 1914 and advancing to president of Standard Oil Company of New Jersey before joining the parent company.

Smith joined the organization in the engineering department of Bayonne refinery in 1913, and has been president of the refining subsidiary since 1940.

Rathbone has spent all of his 23 years of experience with Standard Oil Company of Louisiana which he joined as a draftsman in 1921. During his advancement to the presidency of that company he has been responsible for many of the innovations that have made Baton Rouge refinery one of the largest integrated refining and petroleum chemical plants in the world.

Boyer joined Standard Oil Company of Louisiana as a chemical engineer in the development and research department in 1927, was general refinery superintendent in 1933, advancing to vice president in charge of manufacturing in 1936.

EUGENE HOLMAN

Exceeding all previous records, Standard Oil Company (New Jersey)'s world-wide crude oil production and refinery runs reached an all-time high during the first half of this year. Gallagher reported to stockholders at the meeting in New York, that today the company is averaging more than 840,000 barrels of oil daily, about 18 percent more than the previous peak record of 711,000 barrels in 1941. The company's domestic units are responsible for most of the increase, yielding oil at a rate 60 percent higher than in 1941.

For the first time in the company's history, its world-wide refinery runs have topped 1,000,000 barrels daily. For the first quarter this year, the rate was 1,026,152 barrels, or 13 percent beyond the previous high of 910,490 barrels, which was also in 1941. Domestic refineries show most of the increase.

Defense Plant Corporation To Sell Surplus Material

An office of Defense Plant Corporation, Materials Division, opened at 516 Rusk Building, Houston, will have charge of the disposal of excess construction material and equipment on all DPC properties in the Houston area. A program has been instituted to expedite the return of surplus pipe, valves and fittings to channels of normal distribution. Proposals will be accepted for the purchase of all materials regarded as surplus. Large quantity proposals are preferred since office personnel is insufficient to handle large numbers of small orders. Inventories of materials are on file for inspection.

Offices in other districts will be opened at a later date.

Pacific Northwest Fuel Rationing Will Continue

Indefinite continuance of fuel-oil rationing in the Pacific Northwest, even after it may become possible to lift it in other sections of the country, was foreseen last week by Deputy Administrator Davies, who warned against "wishful thinking" that there will be a plentiful supply for Washington, Oregon and parts of Idaho before Japan and Germany are defeated.

Contributing factors, Davies said, are diversion of tankers which normally operated on the West Coast and limited transportation and refining capacities of the area, rising requirements of the Navy for its Pacific war, expected increase in Army demand as operations widen, and the tremendous industrial and civilian demand arising out of war production activities on the West Coast.

Currently, oil stocks on the Pacific Coast are little more than half of peacetime levels, the latest inventory figures, for April, showing that there were 24,200,000 barrels of residual fuel oil, against 46,700,000 barrels at the same time in 1942, and 7,600,000 barrels of distillate fuel oil, against 11,500,000 barrels.

Phillips to Construct 9-Story Office Building

Phillips Petroleum Company has announced plans for construction of a nine-story office at Bartlesville, Oklahoma, and is negotiating to obtain priorities on materials. Originally a postwar project, construction cannot longer be delayed because of need for space now, officials said. The first floor will include an auditorium with seating capacity for 1200, a gymnasium with club room facilities, a swimming pool which will serve as an ice skating rink in winter, and a kitchen and cafeteria. The second floor will include small dining rooms, conference and instruction rooms, a historical room and products display room and the next seven stories will accommodate the company's offices.

Texas Allowable for July Exceeds Figure of PAW

Texas Railroad Commission in its statewide proration order for July, Friday fixed a total allowable of 2,208,188 barrels of petroleum liquids per day. This includes 2,064,698 barrels of oil and 143,490 barrels of distillate and natural gasoline. The new allowable exceeds PAW recommendation by 4188 barrels per day. The order provides for 24 producing days for most of the state and 23 days for East Texas, which is one more day than for June and will mean an allowable of 369,965 barrels per day for July. The allowable for Sugar Land was reduced from 11,000 to 8000 barrels per day, as requested by Humble Oil & Refining Company.

The Panhandle is to produce 27 days, and Van 25 days.

Nominations filed by purchasers totalled 2,227,388 barrels per day, an increase of 37,327 over the June nominations. West Texas had the largest increase, 22,539 barrels, and the Hawkins-Talco area was next with an increase of 10,165 barrels.

The commission reported that the

pressures in the East Texas field have risen 1.03 pounds during May, and Bryan Payne said that the decline for the field during the first five months of 1944 was only 0.15 pounds. During that period more than 56 million barrels of oil have been produced. It was recommended that the field continue production at the current rate.

Extraction of Oil From Sandstone Being Tried

Experimental work which may add to the country's oil reserves now under way by the Bureau of Mines is aimed at developing an economic method of extracting oil from the sandstones of Kern, Ventura, Santa Barbara, San Luis Obispo, Santa Cruz and Mendocino Counties, California.

Saturated with a true petroleum similar to that taken from wells, the California sandstones have been the subject of experiments from time to time over the past 50 years, and in some areas they have been mined, principally for asphalt.

The bureau already has been able to extract oil from a San Luis Obispo deposit, by moistening the rock with a small quantity of gas oil, heating it to about 180 degrees Fahrenheit, and washing the sand in hot water to which a small amount of sodium silicate had been added. More than 95 percent of the oil in the stone is estimated to be recovered, the producing being a black, sticky and heavy oil capable of producing good grades of gasoline.

Geological Group Hears Talk on Canol Project

At a recent meeting of the North Texas Geological Society, in Wichita Falls, Texas, Fred Bittgood, construction engineer of Wichita Falls, gave a talk on the Army's Canol project in Northwestern Canada and Alaska. He spent several months there doing supervisory and engineering work, and is leaving soon for the Aleutians where he will be working on another Army project.

L. A. Puzin, district manager for Schlumberger Well Surveying Company, also gave a talk on the use of technical data in interpretation of electrical logs.

Pendleton to Lecture

A lecture on "Newly Developed Method of Making Topographic Maps from Aerial Photographs" by Dr. T. P. Pendleton, chief topographic engineer, United States Geological Survey, will be delivered before a general gathering of California oil men June 21 in the Edison Company auditorium, Los Angeles. The American Petroleum Institute is joining with AAPG, the AIME and civil engineers in sponsoring the event.

Croneis Heads Beloit

Dr. Carey Croneis, of the department of geology at the University of Chicago, has been named fifth president of Beloit College, Beloit, Wisconsin. Dr. Croneis served during the past year as editor of the bulletin of the American Association of Petroleum Geologists.

Increased Elk Hills Production Provided for Until End of War

Final settlement of the long-standing controversy over development of Naval Reserve No. 1 was in sight this week, following passage by the Senate without a formal vote June 12 of a resolution authorizing the Secretary of the Navy to increase wartime production from Elk Hills from 15,000 to 65,000 barrels daily, and the bill outlining the principles to be followed in writing the operating agreement with Standard Oil Company of California.

Previously passed by the House, the measures are now at the White House for approval by President Roosevelt.

Under the resolution, up to 30,000,000 barrels of oil may be withdrawn from the reserve, if needed for the war effort, but under the bill the Navy is to cease operations and conserve the oil in the ground as soon as the present emergency requirements cease.

The bill definitely gives Congress a broad measure of control over operations in the reserve, by requiring the Navy to report all of its activities to the Naval Affairs Committees of the two houses, and providing that authority must be secured for all production operations.

To prevent the by-passing of Congress by using Navy's receipts from the oil to finance further operations, it is provided that the government's share of the production shall be sold to the highest qualified bidder and the money so secured deposited in the Treasury; it is also provided that all expenses incurred by the Navy shall be met out of funds appropriated by Congress.

After the emergency, the only production to be allowed is that required to compensate Standard Oil Company for expenses in protecting the field and to compensate it for placing its lands under the exclusive jurisdiction of the Navy.

Of considerable importance is a provision that no leases of any portion of the naval petroleum reserve, no contract to alienate the use, control or possession thereof from the United States, no contract to sell the oil and gas products thereof, no contract for conservation or for compensation for estimated drainage, and no exchange of any land, shall become effective, or any condemnation proceedings be instituted until after consultation with the naval affairs committees.

The bill provides that the Navy may acquire private lands by purchase within the reserves, or outside the reserves but on the same geologic structure, but in the case of Reserve No. 1 may condemn if necessary to protect against substantial drainage.

This provision was incorporated to allay fears expressed in many quarters that unless the authority of the Navy was not curbed it might embark on a broad program of condemning lands within and without the other naval reserves. Together with the requirement that Congressional approval be secured to all arrangements, it was represented there will be no opportunity for the Navy to take arbitrary action.

Crude Oil Production in the United States

(Estimates compiled by The OIL WEEKLY. All figures indicate daily averages, in barrels.)

STATE OR DISTRICT	PRODUCTION IN WEEK ENDED June 17	June 10
Alabama	100	100
Arkansas	80,800	80,500
California	848,700	840,200
Colorado	8,800	8,300
Florida	50	35
Illinois	205,300	201,200
Indiana	12,300	12,600
Kansas	284,100	258,700
Kentucky	20,200	22,200
Louisiana	362,600	362,100
North Louisiana	73,600	73,200
South Louisiana	289,000	288,900
Michigan	50,200	50,500
Mississippi	42,900	43,400
Missouri	100	100
Montana	22,930	22,520
Nebraska	1,100	1,100
New Mexico	108,100	108,000
New York	13,500	13,600
Ohio	7,200	7,250
Oklahoma	331,800	330,500
Pennsylvania	39,600	40,000
Tennessee	35	35
Texas	2,037,000	2,036,600
Upper Gulf Coast	528,800	528,600
East Texas Field	360,800	360,750
Rest of Eastern Texas	145,000	145,000
Lower Gulf Coast	215,650	215,600
Southwest Texas	77,500	77,500
South Central Texas	19,800	19,800
West Texas	447,950	447,850
North Texas	149,500	149,500
Panhandle	92,000	92,000
West Virginia	8,000	9,000
Wyoming	81,250	82,900
Total United States	*4,566,665	4,531,440

Three Months Allowed To Make Up Underage

Operators of wells producing gas only in the West Cement-Medrano pool have been granted an additional three months from May 31 within which to make up underage accumulated on said wells provided no operator may make up underage in any amount greater than the current allowable of the well as provided in the general rules governing the pool, the Oklahoma State Corporation Commission has ordered.

The Commission also authorized Portable Drilling Corporation to produce oil and gas through one string of casing in Long 1, 30-11n-10e, Okfuskee County. The order says that gas may be produced from the Cromwell sand at 3123 feet and same permitted to go down between the casing and tubing to lift the oil produced in the Hunton lime at 3680 feet. The well is located in a small Hunton pool and was on point of abandonment before the authorizing order was given.

Venezuelan Oil Gains

Venezuela has leaped from third to second place among the oil-producing countries of the world since the outbreak of the war, according to Harold Riggs, geologist for Gulf Oil Corporation, on his return to this country recently. The South American country, in Riggs' opinion, could easily become the world's foremost oil producer if equipment could be obtained.

PAW To Make Every Effort To Accept District 3 Proposals

Suggested revisions for more effective production program termed "good and specific" by Davies whose conference with operators was most amicable

By A. R. McTEE, Staff Writer

SUGGESTED revisions to PAO-11 as outlined by the General Committee of District 3 were presented to Deputy Petroleum Administrator, Ralph K. Davies and members of his staff, at an open meeting in Houston last week. Assuring the gathering that PAW would "weigh and weigh seriously," all the proposals, "and make every effort to accept them and introduce them," the Deputy Administrator left Houston, Thursday afternoon with the promise that the recommendations would be made a matter of "first business" immediately upon his arrival in Washington. Davies accepted the proposed changes as "good, specific suggestions," in the same spirit of mutual interest in aiding the war effort that prompted their origin.

He stressed the point that there could be no fundamental differences in the viewpoint of PAW and the oil industry, inasmuch as both have the same purpose at heart, namely that of doing everything possible to aid in winning the war by providing an adequate supply of oil. In addition, both the industry and PAW are of the same mind that just as soon as the war is over, PAW will be fully and completely liquidated, and all authority taken from the states and their regulatory bodies will be returned intact. PAW Administrator Ickes and Davies have worked with that understanding from the inception of PAW, and the Deputy Administrator reiterated his determination to "not be a party to anything destructive to the oil industry." His statements were favorably received by the meeting which gave unanimous approval to PAW for its accomplishments.

Suggested Revisions

George A. Hill, Jr., chairman of the Production Committee of District 3, after giving a short history of developments leading up to the meeting, presented suggested revisions to PAO-11, which changes it is believed "will be helpful in obtaining a greater effective utilization of material and manpower at this time." They follow:

1. Eliminate distance provisions with respect to oil well drilling in those states having regulatory bodies constituted to exercise such jurisdiction. Such a modification would permit industry and state regulatory bodies to determine what, in their opinion, should be the most effective ultimate development pattern for any particular field or pool.

2. Require that operators in drilling oil wells continue to conform to present requirements of PAO-11 with respect to size, shape, and ownership of drilling units. However, as material becomes more available, PAW should relax requirements as to size of drilling units in conformity with the recommendation of the industry and state regulatory bodies for the individual field or pool.

3. Where more than one reservoir or pool occurs in the same field and such pool is so recognized in the orders of state regulatory bodies, it may be developed in conformance with paragraphs 1 and 2, and development of each reservoir should be permitted independently of wells drilled to other reservoirs in the same field. In many instances in the same field, reservoirs of appreciable size that would contribute greatly to the war effort have not been developed so that they can produce at their maximum efficient rate because of the present restriction limiting the drilling unit to surface spacing.

4. Restrictions with respect to working over or deepening wells should be modified to permit recompleting a well in the same pool from which it had previously produced without any restriction. If the well is completed in a pool other than that from which it had previously produced, the only requirement should be that it conform to drilling unit requirements for that pool.

After Adequate Supply

5. Require that any well drilled for oil in any oil field, but completed as a gas or condensate well, shall not be produced for other than drilling or lease purposes beyond a 15-day test period unless it is completed on a 640-acre unit, or unless an exception is granted by PAW, or unless supplemental orders applicable to particular fields are entered or exist.

6. It should be permissible to drill gas or condensate wells without restriction other than that of state regulatory bodies, provided each well is located on a 640-acre drilling unit.

7. The use of second-hand pumping equipment should not be limited to any particular well density providing no new surface equipment is required to complete a single well installation, allowing an expenditure of $100 for new small surface items of a minor nature.

Commenting on the proposals, Hill said:

"In making these suggestions for the modification of the present PAO-11, District 3 Production Committee has new limited its recommendations to those features that will permit the industry, at this time and under existing circumstances, to more nearly insure an adequate oil supply for the successful prosecution of the war. Certainly, as material becomes more readily available, it is the Committee's recommendation that additional relaxation should be effected."

N. C. McGowen, chairman of the Natural Gas and Gasoline Committee for District 3, proposed that production of natural gas and gasoline could be helped if expenditures for gathering lines could be increased from $5000 to $10,000 without MRO priority. Also he suggested that expenditures for recycling and natural gasoline plants be raised to $10,000 and that priority assistance be raised from $500 to $5000. He asked that these two recommendations be included in those presented by Hill.

Pumping Equipment Change

It was brought out that restrictions on density of pumping equipment is having a bad effect in East Texas where wells are being abandoned constantly. Because PAO-11 limits one pumper to 10 acres, it becomes impossible to transfer lifting equipment from a poor well to a good one and consequently production is being curtailed automatically on many leases. Change in this provision of the order was suggested.

Representatives from regulatory bodies in Texas, Oklahoma, Kansas, New Mexico and Louisiana testified that production and drilling operations in their respective states would be benefited by relaxation of PAO-11 as sought be the general committee. Removal of restrictions on development of multiple sands would yield considerable new production immediately in many fields. Conservation officials of the various states agreed that their states were willing, able and ready to take over regulations. Beauford Jester, chairman of the Railroad Commission of Texas, added that Texas serves notice on PAW now, that at the close of the war she will foreclose her lien on what authority the federal government has absorbed from the state, to regain it in full. He also emphasized that the quicker PAW relaxes restrictions as outlined in recommendations presented at the meeting, the quicker Texas can get down to the urgent business of producing more oil for the war effort. The same thought was expressed by the Oklahoma representative.

About 200 members of the oil industry attended the meeting which was presided over by C. F. Roeser, chairman of the general committee for District 3.

Aid for Aviation Gasoline Components Now Revoked

Revocation of Recommendation No. 28, urging state regulatory bodies to grant preferences for production of aviation-grade crude and aviation-grade gasoline components, was announced last week by PAW.

Issued in January, 1942, when military requirements for aviation-grade crudes were so much greater than those for other oils that it was necessary to spur their production, the recommendation is no longer needed now that requirements and production of all grades of oil are at an all-time high and will continue at a level that will permit maximum efficient production of the aviation grades.

Operating Problems and Techniques Talked at Southwest API Meet

Twelve papers presented at gathering in Houston with corrosion in high-pressure gas production equipment and use of plastics in plug-back work given attention. W. S. Winn named chairman

By GEORGE O. IVES, Staff Writer

EMPHASIS was placed on operating problems and techniques at the spring meeting of the Southwestern Division of Production, American Petroleum Institute, held in Houston June 13, and 14, 1944.

Twelve papers were presented during the four sessions. Technical papers dealt with such problems as corrosion and spacing in distillate fields, progress in use of plastics for plug-back work, cause and prevention of blowouts, dual completions, salt water injection, pumping wells, and problems encountered in drilling the world's deepest well. Papers were also presented analyzing postwar economic problems of the industry, vocational training, and the part petroleum plays in the invasion of Europe.

Abstracts of the papers follow:

Dual Completions—Operating Problems

Sponsored by Southwestern District Committee on Production Practice, R. O. Garrett, Chairman

Answers were received from only about 40 percent of the questionnaires sent to operators of dual wells, and of those received 60 percent covered wells completed in 1943 and 1944. Little or no information was given as to workover, maintenance and operationg problems, indicating that while dual wells may be successfully completed not too much information is available as yet on operating problems. The committee, therefore, was not able to present a comprehensive study of dual well operating problems, and cannot do so until the industry supplies the necessary data. The committee believes that consideration should be given to the following points before dual completion is attempted: 1. A careful study of the cementing problems in each area where a multiple zone completion is proposed should be made, as a complete segregation of each productive horizon is absolutely necessary. 2. Difficulties have been encountered through destruction of packers by irregularities in casing, particularly at perforation points. This has been eliminated by reaming casing before attempting the packer setting. 3. Because of the number of packer failures, packers designed especially for dual completions should be given more consideration by manufacturers. This is necessary because of the extreme differentials in pressures which may possibly be exerted on either side of the packer; also the substantial temperature changes involved. 4. There is a need of improved means for determining bottom hole pressures in order to facilitate reservoir studies, etc. Although there are at present methods to accomplish this, they are expensive, time consuming, and subject to mechanical difficulties. 5. Sand cutting of tubing opposite perforations has been encountered and experiments show that the use of lead or rubber coating may eliminate or reduce this problem. 6. Careful consideration should be given to the amount of tubing weight allowed to rest upon the packer as this will vary with depth, temperature and types of packer.

Story of the World's Deepest Oil Test

By C. A. DANIELS
Division Superintendent, Western Div.
Phillips Petroleum Company

Phillips Petroleum Company's Price 1 set a record as the world's deepest well, and also a record of setting the world's longest string of 5½-inch casing. It was spudded on June 30, 1942, expecting to reach Ellenberger around 8000 to 8500 feet, but had to drill to total depth of 15,279 feet to reach its original objective April 12, 1944 after 21½ months. (Details of drilling and setting the casing respectively were covered in THE OIL WEEKLY April 24, 1944 and May 29, 1944.) In drilling from 520 feet to 15,279 feet, a total of 477 bits were used, mostly rock bits, for an average of 30.9 feet of hole per bit, $50,000 being expended for bits alone, or at the rate of $3.30 per foot for this one item. In the extremely hard 125-foot chert section at 12,829 feet 148 bits were used and 6 wire lines were worn out. Total cost for drilling this 125 feet being $150,000 or nearly $1200 per foot. In all, 17 wire lines were used at $1250 each, amount to $21,250 for lines alone. Eight complete sets of brake linings used cost $1624. Approximately $29,592 was spent for Butane fuel, with $3822 worth of Diesel fuel bringing total fuel cost to $33,414. The company spent $25,302.15 for mud, which with an additional $6190 for drayage, brought total mud cost to $31,492.15, or $2.13 per foot of hole drilled.

Technical Problems of Salt Water Injection

By F. W. JESSEN
Humble Oil & Refining Company

In 1929 a study by the Bureau of Mines indicated return of oil field brines to subsurface formations appeared feasible in isolated instances only. In contrast it is now common practice throughout oil producing areas and the procedure is now routine instead of experimental. Many problems remain, however, in design and operation of salt-water disposal systems. Chemical composition of brines determine whether open or closed systems will be installed. Advantages of the closed system are reduction of corrosive properties of the fluid, making possible use of ordinary steel pipe, part elimination of chemical treatment to cause precipitation since loss of chemical equilibrium due to pressure reductions is minimized. A disadvantage is that it is more complex, requiring facilities for trapping oil, treating, sedimentation, and filtration at the same time excluding air from the process. Development of more satisfactory methods of separating oil from the brine without exposure to air would be highly beneficial. Ideal conditions for disposal plants in open systems requires absolute separation of oil before aeration begins. Present methods are not entirely adequate. Aeration causes oxidization of soluble ferrous salts to insoluble ferric state for subsequent precipitation in the settling basin. At least 8 hours and preferably 24 hours should be allowed for settling. Filtration and chlorination of water is one of the most important operations, reducing bothersome spore-forming bacteria. Important considerations in the injection well are a clean sand surface and use of tubing and other fittings treated or coated to resist corrosion. Recent developments include use of tubing coated with thermo-setting resin, and no doubt there will be increased use of plastic coatings. High-pressure pumps of either reciprocating or centrifugal type are widely used, with principal trouble that of corrosion. Recently glass or porcelain-lined pumps are gaining favor.

Factors Influencing Well Spacing In Condensate Fields

By E. O. BENNETT
Consulting Engineer
Houston, Texas

Condensate production rarely follows spacing patterns used in oil or gas fields. Characteristics in each pool, and development to any given time control location of new wells. Initial problems are exploratory, to determine upper and lower limits of condensate production, and size of the field, as well as reservoir data such as net pay, permeability, etc. These data should be secured by drilling as soon as possible to determine reserves, and size plants needed and also how production or injection wells fit into the pattern. Presence or absence of oil, quality or character of reservoir gaseous fluid, and whether fields will be unitized have bearing on spacing. The fields separate themselves into 5 divisions, as follows: *Condensate pools with no liquid—not cycled.* If too small to justify cycling spacing resolves itself into control by availability, character, and distribution of reserves. *Condensate pools with no liquid—cycled.* If unitized, wells would be located along top or one side of structure with input wells on the edges,

away from producers to allow invasion of condensate-bearing formations by the dry gas. *Condensate fields with liquid — not cycled.* Here oil operators may or may not unitize with condensate group. If not, spacing is controlled by market demand and reservoir character, but if unitized, input wells would be at top of structure with producers at or slightly above gas-oil contact. Upper edge oil wells could be converted to condensate as they become gassy. This also applies to—*Condensate Fields with liquid—cycled.* However, in this classification complex problems arise with competitive drilling, where offset requirements must be met. *Limestone condensate reservoirs,* where spacing depends on acre-foot of pay, maintaining availability of pay, and practicability of cycling. Massive limestone or dolomite with small pores and low permeability is usually commercial only when fractured. Intergranular limestone problems may be similar to sandstone. As a whole, spacing problems in condensate production require individual field study and no general spacing rules can be set up.

Theory and Practice in Equipping and Operating a Pumping Well

By A. S. ROSS, Engineer
The Texas Company

Application of a few fundamental engineering principles will go a long way toward lowering pumping costs by reducing repair work, lengthening the service life of equipment. The horsepower required will govern selection of surface equipment. In actual practice it has been found that a unit slightly above indicated horsepower and a multi-cylinder engine approximating the peak requirement at 1000 feet per minute piston speed will give a well balanced installation. Speed is the basis for the entire pumping operation since it affects peak load and distribution of power through the stroke cycle. One well showed by dynamometer tests that increasing speed from 29 to 32 strokes per minute decreased peak load 1250 pounds with a small increase in polished rod horsepower and eliminated sharp stress reversals, at the same time increasing fluid production. The change in speed smoothed out harmonious vibration in the rod string. A long, slow stroke tends to give less trouble in most wells where production contains solution gas. Gas anchors may be used in reducing effects of solution gas, or the traveling valve on the pump may be placed at the bottom of the plunger in a blind cage, reducing space between the valves. The smallest pump that will handle the required production should be chosen, particularly where volume of fluid entering the well bore is less than displacement of the pump, causing fluid pound with resultant wear on pump, rods, and tubing. Generally an insert pump is preferable because it can be pulled for repairs without pulling tubing. Metal-to-metal pumps are more satisfactory where enough oil is produced for good lubrication, consideration being given to metals for ability to resist corrosion. For wells producing large percentages of salt water, ring or cup valves will probably be more satisfactory due to lack of natural lubrication for moving metal parts. In wells producing sand or other abrasive materials the traveling barrel construction will prove more practical. Proper calculation and adjustment of stroke at the pump can increase production materially, particularly in deep wells. As to surface equipment, one of the most important factors is proper counterbalancing which can add to the life of the engine by reducing constant acceleration and deceleration. On wells tested it was found that addition or removal of as little as 400 pounds of counterbalance reduced polished rod load as much as 1000 pounds.

—Photo by Marguerite Campbell

New officers of the Southwestern District of the American Petroleum Institute's Division of Production include those shown above. Seated, left to right, are: W. E. Winn, Sun Oil Company, Dallas, chairman of the district; J. H. House, Humble Oil & Refining Company, Midland, vice chairman for West Texas; Robert E. Bridges, Humble Oil & Refining Company, Houston, secretary-treasurer. Standing, left to right, are: Carl A. Young, Dallas, national secretary of the API Division of Production; Bryan Payne, Iowa Payne Oil Company, Kilgore, vice chairman for East Texas; and J. M. Cooper, Gulf Oil Corporation, Houston, vice chairman for Texas Gulf Coast. In addition to those shown in the photograph, other officers are: M. L. Euwer, Union Sulphur Company, Sulphur, La., vice chairman for South Louisiana; H. C. Anderson, Texarkla Oil Corporation, Shreveport, vice chairman for Arkansas-North Louisiana; and W. A. Clopton, United Gas Pipe Line Company, Wichita Falls, vice chairman for North Texas.

High-Pressure Production Equipment Corrosion

By THOMAS S. BACON
Research Engineer
Lone Star Producing Company

A cooperative research program is being organized by the Natural Gasoline Association of America for study of this new corrosion problem, and a commercial research institute is being retained. A recent survey of 54 high-pressure fields showed that 23 had evidence of serious corrosion while 31 have had no appreciable amount. In some wells the tubing may be unaffected, while serious corrosion and failure of parts has occurred in the Christmas tree and flow lines. In many cases one end of a fitting may be free of corrosion while the other has reached the point of failure. In certain fields, wells side by side producing under as nearly as possible duplicated conditions have shown serious corrosion in one and none in the other. Injection of chemicals into the stream below surface fittings has been partly successful, but these usually have an adverse affect by depositing chemical scales. Causes of this corrosion are not definitely known. Companies are investigating and it is the function of the API sub-committee on high-pressure corrosion to assist in interchange of ideas and data. Certain theories are that rate of corrosion is affected by rate of flow of gas, and fluid film behavior at high flow rates. Use of alloys has been suggested to resist corrosive action, but long observation periods are required. (Full text of this paper appears in this issue of THE OIL WEEKLY, page 34.)

Blowouts—Causes and Prevention

By MADDEN T. WORKS, Chief Engineer
Cameron Iron Works

In the Texas and Louisiana Gulf Coast districts there were 30 serious blowouts during 1943. Study of the answers to questionnaires sent to operators who have had blowouts does not give enough evidence to offer a definite solution. However, results do show that many blowouts can be traced to bad practices. Destruction of surface equipment by storms or lightning cannot be prevented; also there are cases where abnormal pressures are suddenly encountered which cannot be controlled by the most carefully selected equipment. Sudden loss of returns in cavities

or crevices should not, in most cases, result in a wild well if adequate control equipment has been provided. Causes of blowouts may be classified generally into two groups—those under control of management, and those under control of subordinate personnel actually doing the work in the field, as follows:

I. *Causes Under Control of Management*—(a) Use of improper drilling mud. (b) Failure to provide an ample reserve supply of mud. (c) Inadequate mud pumping equipment. (d) An inadequate casing program. (e) Inadequate, obsolete, or worn out control equipment. (f) Lack of periodic inspection of vital equipment and failure to authorize necessary repairs; (g) Failure to give complete and concise instructions to subordinates, and insufficient supervision. (h) Lack of a practical educational and safety program.

II. *Causes Under Control of Subordinate Personnel*—(a) Drilling gas sands too fast. (b) Pulling drill pipe off bottom too rapidly. (c) Balling up the bit or drill collar by crowding in sticky formations. (d) Using too large a diameter drill collar. (e) Pulling pipe out of the hole before the mud is in proper condition. (f) Failure to run fill-up pump frequently while pulling pipe from hole. (g) Use of low pressure fittings in high pressure control manifolds. (h) Procrastination in making rig repairs. (i) Continuing to drill or circulate during a heavy rain. (j) Failure to maintain the reserve mud supply in condition for use. (k) Lack of general vigilance for the unmistakable signs of gas. (l) Failure to obey specific instructions.

Most causes under control of management are due to careless or imprudent practice; many are due to false economy. Most causes under control of subordinate personnel can be traced back to management through lack of attention to a thorough educational program and efficient supervision.

Oiling the Invasion

By ROBERT E. ALLEN
Director Department of Information
American Petroleum Institute

The greatest military operation of all history—the long-awaited invasion of Fortress Europe is under way. All the war headlines emphasize that this is an oil war with the invasion powered by and dependent upon petroleum products. We have 3,750,000 soldiers overseas, and it takes a barrel of oil every 3 days to transport, keep, and protect each soldier. This means our expeditionary forces require 1,250,000 barrels of petroleum products a day — more than the entire output in 1921. When our overseas army reaches 5,000,000 men, with 2,000,000 more in this country, army requirements will be around 2,000,000 barrels daily. Use of fuel oil by our navy has probably been quadrupled since 1942 by the greater distances at which it operates now. Demand for aviation gasoline keeps rising. In May when United States bombers dropped 63,000 tons of bombs on Europe, these planes consumed nearly 60,000,000 gallons of aviation gasoline and it took 15,000,000 barrels of crude to make that much gasoline. Petroleum waxes are widely used, petroleum-base rust preventatives are required for machinery, hydraulic oils for airplane equipment, and lubricants that stand up under extreme ranges of temperature must be supplied. Petroleum is also used in conditioning clothing, in medicines, and many secret products. Miracles of production, refining, and transportation have made this oil available but the public takes petroleum for granted. Oil men should tell the facts about the industry whenever the occasion arises.

Plug Back Work with Plastics

By E. B. MILLER, JR.,
Tide Water Associated Oil Company

Plastics have recently been developed that can be controlled over a wide range of temperatures, from 80 degrees to 280 degrees Fahrenheit, and setting time can also be controlled by use of varying amounts of catalyst. Viscosity is greatly influenced by temperature and plastic changes from liquid to solid by a gradual thickening. At 82 degrees Fahrenheit the high-temperature plastic has viscosity of 850 centerpoises, low temperature plastic has viscosity of 188 centerpoises, compared with 285 centerpoises for S.A.E. 40 motor oil. Tensile strength of 240 pounds and compressive strength of 1900 pounds per square inch are comparable with neat cement. Solid plastic is chemically inert, being insoluble in crude oil, brine, fresh water, and other materials commonly found in oil wells. For use in plug-back jobs it is necessary to have a clean surface exposed through which plastic may penetrate and set up. As a true liquid it can be forced into the formation at lower pressures than suspended solids, and since it sets up in oil or gas bearing sands it is desirable to keep it below the anticipated producing zone, although it is possible to re-establish permeability by gun-perforating where this zone has been covered. Excellent bonding quality to steel makes it an effective plug in liners or casing, plugs of this type having been subjected to laboratory test pressures of 6000 pounds without failure. A new development in the dump bailer method of using plastic consists of dumping the required amount of plastic on bottom, then, using a special bailer, dump ¼-inch pea gravel in the plastic. With no formation loss, 3 gallons of plastic should fill the voids in 10 gallons of gravel. Flaked cellophane may be used to reduce losses into permeable formations. The tool for using plastics in squeeze jobs consists of two 1 3/16-inch choke nipples spaced about 2 feet apart on bottom of 2-inch tubing. Chokes have tapered throats and the top choke is designed to be used as a back pressure valve. A rubber plug about 6 inches long is placed in the tubing ahead of the plastic, and a second rubber plug on top of the plastic, the desired amount being accurately measured and confined. Additional pressure required to force plugs through chokes at bottom gives positive indication when plastic reaches the bottom. The first plug is pumped through both chokes and plastic is spotted, beginning at the bottom of perforations. The second plug is pumped through the top choke but not the bottom, thus serving as a back-pressure valve to keep heavy mud in the casing from pushing plastic back into the tubing, which is then raised up out of the plastic. The second plug is kicked out, rams are closed about tubing, and pressure applied, displacement being measured at surface from a calibrated tank. It is also possible to squeeze with plastics using retractable or drillable retainer methods. Other probable effective uses of plastics are: Selective plugging in lime fields for acidizing; plugging for gas-oil ratio control; shutting off water sands to eliminate extra casing strings in cable tool areas; tamp for nitro shots; sealing bridge plugs; sealing annulus between casing strings to protect from corrosion; placed around shoe joint when cementing casing; setting blank liners and repairing leaks in casing; selective control of injection zones. Of 539 plug-back jobs in the East Texas Field the first 4 months of 1944, 350, or 64.9 percent, were completely successful; 58, or 10.8 percent were partly successful (50 percent or more of water shut off); and 131, or 24.3 percent were not successful (water not reduced as much as 50 percent.) (Full text of this paper appears on page 65 of this issue.)

Postwar Problems of the Petroleum Industry

By JOHN R. SUMAN, Vice President
Humble Oil & Refining Company

The petroleum industry, in common with all other American business, faces a serious readjustment in the postwar period. In normal times the United States accounted for about two thirds of the world consumption of petroleum. Actual developments of the war have imposed greater demands. Military requirements, now about 1,200,000 barrels daily, amount to about the same as the increase in our production and refining since 1939. Vastly different products have been required. As late as the end of 1941 we produced 45,000 barrels of 100-octane gasoline daily. PAW officials say this will reach 500,000 barrels daily soon. New facilities costing one billion dollars have been built and only about 25 percent has been with government funds. General opinion in the industry is that greater use of products by civilians to offset present military demand will result in a substantial downward readjustment in domestic operations. Demand for domestic crude may well decline 15 percent from wartime peak to below 4,000,000 barrels daily, creating surplus capacity for producing, refining, and transporting. The burden of readjustment must not fall on the few states practicing sound conservation methods. There will be an inevitable tendency for the industry to follow the trend of other American business. The conversion period from wartime to peacetime goods will be difficult, but fortunately it should be short. The public must insist the government do two things: Return to its normal sphere of operations, and facilitate reconversion of private industry. Some of the basic points in a postwar program are the definite responsibility of private enterprise and some of government. Private enterprise must provide employment at fair wages, produce and sell goods at reasonable prices, and assume a long-term point of view to work for a progressive economy involving less violent fluctuations than in the past. Government must maintain the system of individual freedom and private enterprise upon which this country is founded. It should not hinder or compete with such enterprise. It should follow the wishes of the people, and its duties should be administered fairly and efficiently with expenditures held to a reasonable part of national income—around 20 or 25 percent. Government must make plans for balancing the budget after the war.

■ CONTINUED ON PAGE 74

Oil For Tomorrow

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Corrosion of High-Pressure Gas Production Equipment

Problem is a real one insofar as the oil industry is concerned; exact cause unknown with no satisfactory methods yet found to combat menace. Efforts of all needed in current study

By THOMAS S. BACON
Research Engineer, Lone Star Producing Company*

THE petroleum industry has recently realized the existence of a new problem occasioned by high-pressure gas-distillate operations. This problem was first publicly described about a year ago. At that time it appeared that the problem was not widespread, but it has attained important proportions during the past few months.

A paper presented before the Natural Gasoline Association of America convention in Dallas in April, 1943, described internal corrosion of Christmas tree fittings that had been observed in the Opelika field, Henderson County, Texas[1]. This corrosion occurred on the internal surfaces of pipe, valves, and fittings in the Christmas tree assembly and was so severe as to have weakened some of the equipment almost to the point of failure. This particular type of corrosion appears to be unique in that it may be highly localized, causing serious weakening of one end of a length of pipe, while not affecting the other end appreciably[2]. It also occurs in the absence of any known corrosive agents with the possible exception of carbon dioxide. This particular form of corrosion is extremely unpredictable on the basis of present information and, in at least some instances, some wells in a given field will be entirely free from any sign of corrosion, while other wells will be corroded with extreme rapidity.

Corrosion Unpredictable

To emphasize this unpredictability, Tullos 2 well in Opelika field has been produced for several years with a total gas production of 5,225 million cubic feet to May 1, 1944. This well has shown absolutely no signs of internal corrosion of this type. On the other hand, the Tullos 1 well in the same field showed extremely serious corrosion of the Christmas tree in September, 1942, after producing 6,000 million cubic feet. The Tullos 1 well has continued to show serious corrosion and some items of equipment have been replaced on this well after only three months of service. It should be emphasized that these two adjacent wells have been producing under conditions as nearly identical as may be expected in actual operation, yet one well has corroded badly and the other well is enitrely unaffected. The average carbon dioxide content of the gas produced from the corroded well is 1.6 percent, while the uncorroded well shows 1.5 percent carbon dioxide.

Description of Corrosion

The appearances of corroded surfaces vary widely. Figure 1 shows some typical surfaces with severe attack at points of high turbulence in the gas stream. It will be noted that the down-stream section of one of the nipples is practically unaffected by corrosion. Figure 2 indicates another form of corrosion in which the internal surfaces of the fittings are fairly smooth and the internal surfaces of the nipples are attacked only slightly, whereas serious weakening has been caused by removal of the threads on the nipples and by removal of the adjacent threads in the fittings. The appearance of some attacked surfaces might lead to the assumption that erosion plays an important part in the re-

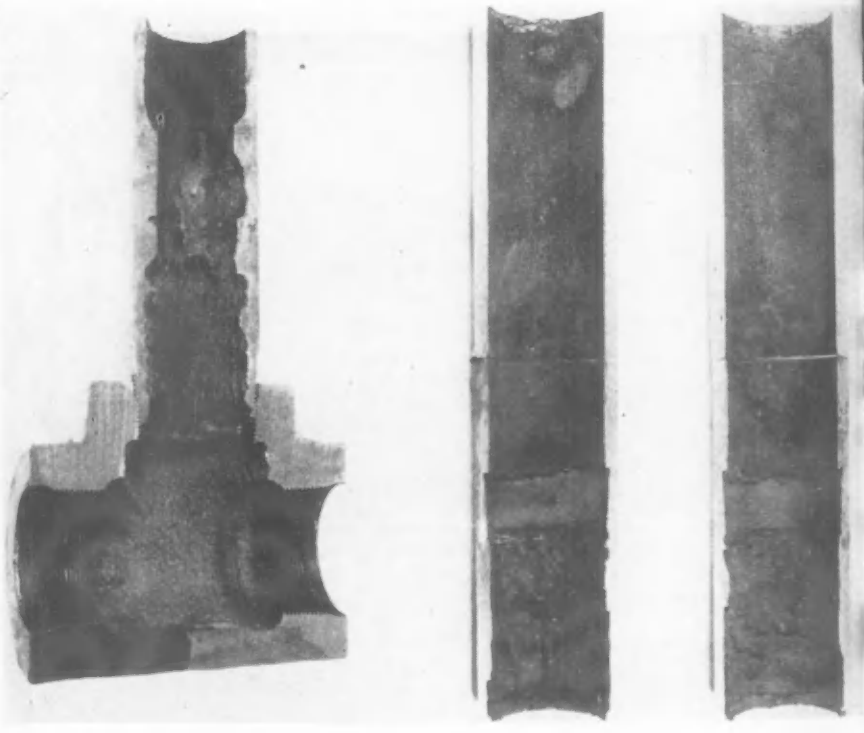

FIGURE 1
Typical surfaces showing severe attack of corrosion at high points of turbulence in the gas stream

*Presented before Spring Meeting of the Southwestern District of the American Petroleum Institute's Division of Production, Houston, Texas, June 13-14, 1944.

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FIGURE 2

Form of corrosion that weakens fittings by removal of threads on nipples, etc.

moval of metal. The experience of Lone Star Producing Company has indicated that the removed metal is largely in chemical solution in the produced water in most cases. This experience and the fact that large pits covered with mechanically weak mill-scale have been found adjacent to the roughened surfaces indicates that corrosion is probably the predominant cause of metal removal.

Dangerous Form

This form of corrosion is particularly dangerous because failure of the high-pressure equipment involved might result in serious property damage. Several flow lines have failed in service. 3. However, in each case of flow line failure which has been reported to date, it has been possible to close the well in before the Christmas tree was seriously damaged. Failure of a master valve under these conditions might conceivably make it impossible to control the well except by the slow and expensive process of drilling a directional well. The expense involved in drilling the directional well and the economic waste occasioned by the escape of reservoir fluids to the air and the possible retrograde condensation losses in the reservoir could easily be sufficient to absorb a considerable portion of the anticipated return from a recycling project.

The economic cost of this type of corrosion is also amplified when tubing fails in the well. Five strings of tubing have been reported as parting in the Cotton Valley, Louisiana field in six months due to this corrosion[2]. Union Producing Company has lost three strings of tubing in other Louisiana fields and reported an expenditure of $71,500 in retubing one of these wells[4]. In addition, such wells in which tubing strings have failed are extremely difficult to kill, even though the surface fittings are intact, and any killing process may result in damage to the producing formation. The Lone Star Producing Company has had at least one case of tubing failure that has been ascribed to this form of corrosion.

In order to be on the safe side, it should be assumed that Christmas tree fittings have been appreciably affected by corrosion on any well in which the tubing has failed due to corrosion, and the killing job should, therefore, be handled with extreme caution. In fact, some experience indicates corrosion of the Christmas tree may occur without appreciable corrosion of the tubing. The Christmas tree on the Allyn 1 well at Opelika was found to be badly corroded about a year ago, and it was decided to inspect the tubing in this well to determine the degree of corrosion in the tubing. The corroded Christmas tree was replaced, and the well was killed and tubing pulled. Inspection of tubing showed it to be in excellent condition, with only slight corrosive attack on the bottoms of tubing joints. The tubing was re-run, and the well brought back into production. The total cost of this inspection was $5,735. On the other hand, in at least one well the tubing failed before the Christmas tree showed corrosive attack.

History

In view of the above considerations, operating personnel have shown an active interest in this problem and in its possible solution. However, it has been difficult to obtain a true picture of the magnitude of the problem, due to the number of fields involved, and due to the short periods of operation of many important distillate fields. The first step toward concerted action on the solution of this problem was taken at the meeting of the API held in Chicago in November, 1943. The Southwestern District topical committee on materials was assigned to study this problem, and preparation of a paper discussing the problem be presented at the 1944 spring meeting of the Southwestern District.

Thirty-five representatives of interested companies met informally in Dallas in December, 1943, to discuss the problem. Evidences of this type of corrosion were reported at this meeting as having been definitely observed in only seven fields. Close observations of seven other fields, some of which had been producing for many years, showed this type of corrosion to be absent. The problem appeared to be of such importance that an independent committee was organized to investigate the problem, and to serve as a clearing-house for information. There was no information available at this meeting regarding the action of the API in this connection. This independent committee has recently disbanded, in view of the work of other committees on the same subject.

G. H. Calhoun, chairman of the Southwestern District topical committee on materials of the API, appointed a special sub-committee on corrosion of high-pressure production equipment in March, 1944, "to determine causes of, and select remedies for, corrosion of high-pressure production equipment, such as tubing, well-head connections, flow lines, etc., particularly in high-pressure condensate wells." The initial efforts of this sub-committee have been directed toward obtaining further information regarding the extent of the problem.

Results of Operation

Tables 1, 2, and 3 are largely based on the results of a survey of operations of companies having representation on the above API sub-committee. Table 1 lists fields in which corrosion has been evidenced either by failure of equipment, by corrosion severe enough to cause replacement of equipment, or by analyses of produced water samples for iron content.

It should be emphasized that this list of fields in which signs of corrosion have been observed does not include all fields in which signs of corrosion might be observable with careful examination. It has been the practice in the past to assume that sweet gas wells should be free of internal corrosion, and most operators have proceeded on that theory until the past few months. Therefore, many fields have not been examined carefully for signs of this corrosion, and the only possible way in which this corrosion could be evidenced in these fields would be by failure of equipment. Even with severe corrosive attacks, failure of equipment will result only after prolonged periods of exposure, so there is reason to believe that additional fields will show corrosion in the future. Further, the data in Table 1 has been obtained from a few companies only, and no attempt has been made to survey all operators in compiling these data.

In spite of the lack of complete data regarding the occurrence of this corrosion, the frequency of its occurrence as indicated in Table 1 is sufficient to indicate that it definitely presents a real operating problem to the industry.

Non-Corrosive Fields

Table 2 lists fields that have been examined for this type of corrosion, and have been found to be free of corrosion. It is interesting to note that the Rodessa and Pettit formations in the Chapel Hill, Texas field are non-corrosive while the Paluxy formation is definitely corrosive. Here again, this list of non-corroded fields is incomplete. It is also interesting to note that this type of corrosion has not been observed in the South Gulf Coast area.

Table 3 is of interest in indicating the

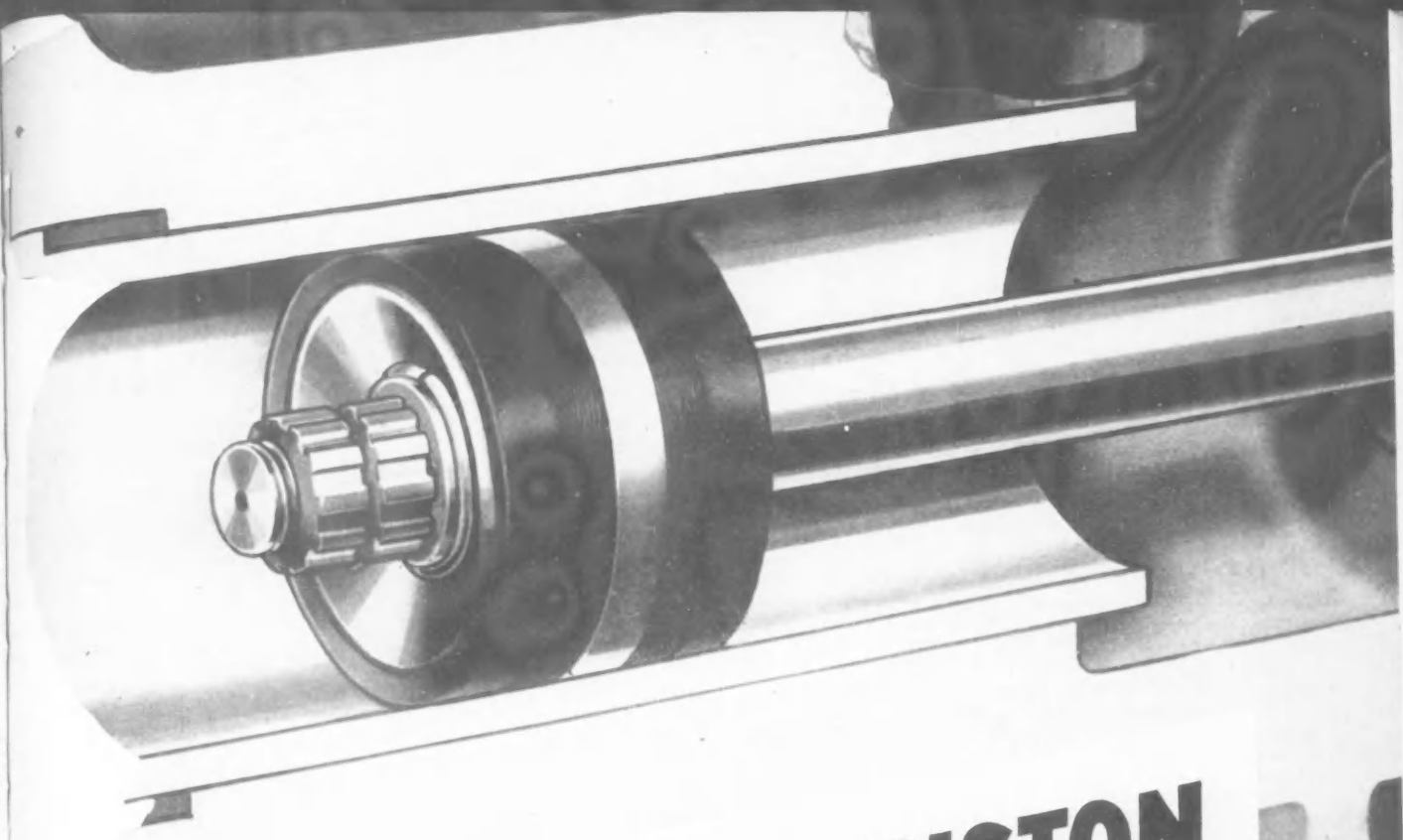

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TABLE 1

Some High-Pressure Fields in Which Corrosion Occurs

FIELD	State	Year Field Discovered	Evidences of Corrosion
Bateman Lake	Louisiana	1937	Replacement of Christmas tree valves and nipples
Brushy Creek	Texas	1941	Surface fittings attacked
Buffalo	Texas	1934	Corrosion of bottom hole chokes, requiring replacements
Cayuga	Texas	1934	Replacements of valves and Christmas trees
Chapel Hill (Plauxy only)	Texas	1938	Choke beans cut out. Surface fittings attacked
Cotton Valley	Louisiana	1922	Failure of two flow lines and five strings of tubing
Delarge	Louisiana	1938	Tubing failure
Grapeland	Texas	1936	Replacement of Christmas tree valves, fittings and nipples
Hester	Louisiana	....	Well-head fittings corroded
Katy	Texas	1935	No evidences of corrosion in 1942. Surface fittings found to be attacked in 1944. Many valves will require replacement
Lake Mongoulois	Louisiana	1939	Replacement of Christmas tree valves and nipples
LaPice	Louisiana	1939	Replacements of valves on Christmas trees
Lisbon	Louisiana	1936	Tubing failures
Long Lake	Texas	1933	Replacements of valves and Christmas trees
North Houston	Texas	1938	Chemical analysis*
North McFaddin	Texas	1937	Chemical analysis*
Old Ocean	Texas	1934	Tubing failures
Opelika	Texas	1937	Replacements of Christmas tree valves and nipples
Orchard	Texas	1936	Replacement of three flow lines after three years of service
Red Fish Reef	Texas	1940	Bottom hole chokes corroded
Texana	Texas	1939	Chemical analysis*
Lirette	Louisiana	1937	Well head fittings corroded
Willow Springs	Texas	1938	Replacements of Christmas tree valves and nipples. (Also probable cause of failure of one tubing string)

*Note: When produced water contains 100 p.p.m. of iron or more, fields are included in Table 1 on basis of "Chemical Analysis". When produced water contains less than 100 p.p.m. of iron, fields are included in Table 2.

frequency of corrosion as shown by the reporting companies. Here again, the data are in complete, but the possibility of finding corrosive conditions in a new field is emphasized. The corrosive conditions have been shown to occur with such frequency that the possibilities of finding appreciable corrosion in any high-pressure field cannot be overlooked with safety.

Corrosion Tests

The above discussion indicates the need for some sure method of detecting the presence of this corrosion so that remedial measures may be taken before corrosion has proceeded far enough to be dangerous. Accurate tubing calipers that could be run under pressure would be of extreme value although, unfortunately, no such instrument is commercially available to the knowledge of the writer[5]. Visual inspection of surface fittings seems to be the most practical way at present to determine the degree of corrosion in these fittings. Chemical tests for dissolved iron in water produced by each well are at least indicative of the likelihood of the presence or absence of serious corrosion[6]. In the writer's experience, corrosion will be almost negligible in wells showing less than 50 parts per million of iron in the produced water. Wells showing iron concentrations of from 75 to 100 parts per million in the produced water should be watched for other signs of corrosion and wells showing iron contents in excess of 300 parts per million should be carefully inspected every three months.

Properly supervised chemical tests for iron in produced water samples are believed to be valuable in safeguarding operations of these high-pressure properties. Water samples should be obtained with care and at frequent intervals and, in the writer's opinion, should be acidified with nitric acid as soon as taken to insure that all iron remains in solution. If it is desired to record the pH value of the produced water, this may be done before addition of the nitric acid by the use of a field kit for the determination of pH. Iron may be lost from solution in these samples on standing even when reasonable precautions have been taken to prevent access of air to the samples, particularly if the samples are of high iron content. It is the present practice of Lone Star Producing Company to install necessary sample taps wherever it is felt that additional chemical analyses are desirable. By determining dilution caused by condensation of additional water vapor from the gas on the basis of the chloride content of the water samples from any one well, it is possible to correlate iron contents of the various samples and, therefore, determine the amount of iron dissolved from the system between each pair of sampling points, if the volume of water produced at any sampling point is known.

The question of concentration of iron in the liquid connate water entering the produced stream from the formation is of importance in this connection. The iron/chloride ratios of ordinary connate waters may be of value in estimating the effect of dissolved iron in the produced connate water on the iron content of any water sample obtained at the surface. Lon Star Producing Company's experience indicates that iron dissolved in the connate water amounts to less than 5 parts per million in the average surface sample.

Chemical tests, coupled with a knowledge of the amount of liquid water in the produced stream at the point of sampling, are of value in estimating the total weight of iron removed from the pipe line system by corrosion. However, these tests do not indicate whether this weight of iron has been removed uniformly from the total exposed metal surfaces to give very slight penetration of the pipe walls, or whether the corrosive attacks has been highly localized, resulting in serious weakening of a part of the metal structure. Therefore, any chemical tests showing appreciable iron concentrations should be supplemented by other methods for determining the location of the corroded surfaces, and for determining the depth of penetration of the metal walls.

It may be assumed that gas in the reservoir is saturated with water vapor under the existing conditions of temperature and pressure. Some of this water vapor will be condensed to liquid water as the gas is cooled during production. The actual volume of water condensed will depend on reservoir conditions and on flow line conditions, but will be of the order of magnitude of 1 barrel per million cubic feet of gas. If it is assumed that water samples at the wellhead show a dissolved iron content of 100 parts per million, the production of each billion cubic feet of gas would result in the production of 35 pounds of iron in solution in the water associated with this gas. If this iron is removed uniformly from the interior surface of 10,000 feet of tubing, penetration of the tubing will be negligible. However, if all of this corrosion is concentrated in the top joint of tubing, this joint will be seriously weakened.

Water samples may readily be obtained from the inlet separator at any recycling plant, and the amount of iron in these samples can be determined at small cost. The total weight of iron per day removed from the system by the water leaving the inlet separator can then be calculated if the volume of water drained from the separator is known. If this weight of iron is negligible, absence of corrosive attack of the production system is indicated. But, if this weight of iron is appreciable, the likelihood of corrosive attack of some part of the production system is indicated.

Occasionally, samples of the produced water will contain insoluble iron compounds. Such cases that have been reported are few, and are difficult of explanation. Presence of insoluble iron compounds in the produced water under flowing conditions will, of course, interfere with any conclusions based on analyses of the water samples, as iron precipitates will vary in concentration in the water sample, depending on the sampling system. If iron sludge or deposits of insoluble iron compounds are found at any place in the system, it is believed likely that corrosion will be found at some place upstream from the sampling point.

Present Remedial Practices

The industry has not yet standardized on any remedy for this type of corrosion. Many operators are presently relying on visual inspections of all equipment that is suspected of attack by this corrosion to reveal any dangerous condition. Any equipment that is found to be seriously weakened in the course of these inspections is replaced by new equipment of the same type. Other operators are specifying that all master valves in high-pressure service be lined with corrosion-resisting alloys. Other operators are injecting chemicals into the flow system at some point in an effort to eliminate corrosion downstream from the point of injection.

Lone Star Producing Company has practiced injection of chemicals into wells in the Opelika field for more than a year. The initial treatment tried in the Opelika field involved the injection of soda ash solution into the well casing at a rate of 1.0 pounds of soda ash per million cubic feet of gas produced from the well. As these wells are produced through tubing only, the soda ash solution injected into the casing trickled down the casing to the producing formation and left the well through the produced gas stream in the tubing. This method of chemical treatment reduced the rate of corrosion materially as indicated by chemical tests and also by visual examination of surface fittings.

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TABLE 2

Some High-Pressure Fields in Which Corrosion Has Not Been Observed

FIELD	State	Year Field Discovered	Oil or Gas	Operating Pressure (Lb./Sq. In.)
Agua Dulce	Texas	1928	Gas	1500—2500
Belle Isle	La.	1941	Gas	3100
Caplen	Texas	1940	Gas	2700
Chacahoule	La.	1938	Gas	3100
Chapel Hill (Rodessa & Pettit)	Texas	1938	Gas	....
Chocolate Bayou	Texas	1939	Gas	4200
Fig Ridge	Texas	1940	Gas	3000
Flour Bluff	Texas	1936	Gas	....
Government Wells	Texas	1928	Gas	....
King Ranch	Texas	....	Gas	....
LaBelle	Texas	1937	Gas	3170
LaRosa	Texas	1938	Gas	2300
Lewisburg	La.	1941	Gas	3000
Lovells Lake	Texas	1938	Gas	....
Neale	La.	1940	Oil	2700
Old Ocean (Campbell Sand)	Texas	1934	Oil	3450
North Bay City	Texas	1942	Gas	1850
North Crowley	La.	1937	Gas	....
North Elton	La.	1939	Gas	2800
North Markham	Texas	1938	Gas	1100 (Bottom hole regulators)
North Winnie	Texas	1943	Oil	2200
Pledger	Texas	1932	Gas	....
Riverside	Texas	1939	Gas	3250
Seabreeze	Texas	1936	Gas	2200
Shield	Texas	1940	Gas	1650
Shuteston	La.	1943	Oil	2200
South Elton	La.	1937	Gas	2850
South Jennings	La.	1936	Gas	3150
Stratton	Texas	1931	Gas	1500—2500
Welsh	La.	1902	Gas	3400
Willow Slough	Texas	1937	Gas	2775

However, a calcium carbonate scale was deposited in the tubing perforation or in the tubing itself that eventually built up to sufficient thickness to act as an effective bottom hold choke. This scale was easily removed by treatment with four barrels of acid per well but reformed at such a rate that acidization was required again in approximately 30 days. In an attempt to reduce the rate of deposition of this calcium scale, the concentration of soda ash was reduced to about 0.10 pounds per million cubic feet of gas produced. An equal amount of sodium hexametaphosphate was added to the solution in an attempt to avoid calcium deposition and also possibly to serve as an inhibitor. An organic chromium compound was also added to the treating solution in the amount of approximately 0.05 pounds per million cubic feet of gas produced to act as an additional corrosion inhibitor. This solution did not appear to cause deposition of sufficient calcium carbonate scale to require frequent acidization. However, this solution was far less effective in reducing the rate of corrosion than was the more concentrated soda ash solution used originally. The organic chromium compound has recently been replaced in this solution by sodium dichromate with 0.20 pounds of sodium dichromate used per million cubic feet of gas produced. Sodium dichromate appears to be much more effective in this service than the organic chromium compound first used.

Lone Star Producing Company has used various other chemicals and inhibitors for short lengths of time on various wells. Aqueous ammonia was injected into one well and reduced corrosion satisfactorily but caused calcium carbonate deposition. An organic corrosion inhibitor was injected into another well for a period of several months with some apparent reduction in the rate of corrosion of the surface fittings. However, traces of sludge in this inhibitor interfered seriously with operation of the pump used for injection, so further work on this inhibitor was abandoned. Sodium silicate was injected into one well-head at a rate of 0.8 pounds of silicate per million cubic feet of gas. A heavy deposit of silica was found in the well-head at the point of injection after three weeks of operation, so use of this chemical was abandoned even though chemical tests indicated excellent corrosion control.

There are a wide variety of inhibitors that might be useful in this service. Additional field tests are planned.

Protective coatings have not been tried extensively in field service. Lone Star Producing Company recently had a section of a Christmas tree coated internally with a synthetic plastic lining that was baked on. This coating was inspected after six weeks of service and appeared to be in perfect condition.

Protective films are subject to failure for one reason or another and it is possible that corrosive attack may be concentrated at points of failure. Satisfactory alloys are not subject to this objection. Therefore, a study of the use of low-cost alloys is indicated. This study would necessarily be slow as possible alloys should be exposed to actual operating conditions for a sufficient length of time to determine whether or not they are slowly corroded in service. Such alloys are extremely difficult to obtain under existing conditions and service tests of at least twelve months would be required to indicate the relative values of any alloys that might prove satisfactory. In this connection, a 2-inch flanged tee which was recently removed from a well in the Grapeland, Texas, field was found to be practically free of corrosion, whereas the two valves bolted directly to the tee were badly corroded. Investigation disclosed that the metal in this particular tee contained approximately 0.5 percent chromium and 1.5 percent nickel. If an inexpensive alloy generally resistant to this type of corrosion could be found, its wide use would be indicated.

Any conclusions based on observations of the behavior of alloys are necessarily subject to question if the exposed surface of the alloy is small, and if the alloy is in electrical contact with ordinary steel pipe or fittings, due to the likelihood of setting up galvanic cells under these conditions in which the alloy could become cathodic, and might be protected at the expense of the adjacent steel equipment. Observations of gate valves have shown that brass guides in these valves, and hard-surfaced disks in these valves, have not been corroded whereas the steel parts of these valves have been badly corroded. Stainless-steel sampling tubes have been unaffected by this corrosion, whereas steel sampling tubes have failed after two years of service. Orifice plates of stainless steel have remained free of any signs of corrosion, while the steel meter runs have been badly corroded.

Successful injection of chemicals into the flow stream below surface fittings is almost impossible for mechanical reasons in a dually completed well or in a well in which the tubing is packed off from the casing. In such wells use of satisfactory alloys or of satisfactory protective films on subsurface equipment appears to be the only practicable means of combating internal corrosion due to the mechanical difficulties of introducing any possible method of chemical or electrical protection into the flowing stream below the surface fittings when the well is in operation. Continuous chemical treatment of any well involves an appreciable expenditure for operation of the injecting equipment, and requires constant and careful supervision, again emphasizing the desirability of alloys.

TABLE 3

Corrosion Experiences of Reporting Companies

Company	Total Fields Reported Operated at Pressures Above 1500 Lbs. Sq. In.	Number of Fields Not Corroded	Number of Fields Showing Corrosion	Percent of Fields Inspected Showing Corrosion
A	4	0	4	100
B	9	3	3	50
C	3	0	2	100
D	4	1*	3†	75
E	10	6	4	40
F	14	13	1	7
G	10	9	1	10
Total...	..	32	18	36

* Based on chemical analysis only.

† Tow fields classed as corrosive on basis of chemical analysis only.

Future Work

An intelligent attack on this problem would require determination of causes of this corrosion. These causes are not definitely known at present. Complete information regarding the chemical nature of the produced fluids and the geologic and physical conditions of production should be of material assistance in attempting to determine causes of this corrosion. To assist in compilation of this information, a comprehensive questionnaire is included as an appendix to this paper. If sufficient numbers of these questionnaires could be filled out showing conditions in both corroded and non-corroded wells, it appears likely that an analysis of the then available data should assist in indicating possible causes of this corrosion. It is, of course, obvious that determination of the causes of this corrosion would be of tremendous value to the operator who drills in a new high-pressure field and must specify the type of equipment to be installed in this field. A knowledge of the cause or causes of corrosion could also be of material benefit in planning ways and means of eliminating or minimizing this corrosion. The questionnaire has been included in this paper to direct attention to many of the details that might have some bearing on the presently unknown cause or causes of this corrosion. Available data showing the approximate ranges of various conditions reported to date as existing in corroded wells are not complete. However, some approximate values of these conditions have also been included in the appendix to show at least some conditions under which this particular type of corrosion has occurred.

Many companies are actively investigating probable causes of this corrosion at present and full interchange of the ideas and data developed by this work appears to be desirable. It is the function of the API sub-committee on high-pressure corrosion to assist in this interchange at present. Two papers dis-

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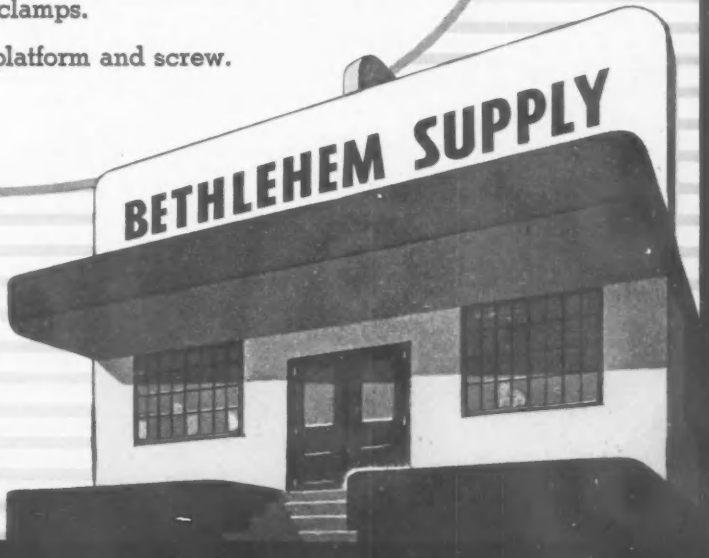

Bethlehem Supply Offices or Stores: **Arkansas**—Magnolia; **Illinois**—Grayville, Salem; **Kansas**—Chase, Great Bend, Pratt, Russell, *Wichita; **Louisiana**—Harvey, Houma, Lakes Charles, New Iberia, Shreveport; **New Mexico**—Artesia, Hobbs; **Oklahoma**—Oklahoma City, Seminole, Tulsa, Wewoka; **Texas**—Alice, *Amarillo, *Beaumont, Borger, Bowie, Corpus Christi, *Dallas, *Fort Worth, Graham, Houston, Kamay, Kermit, Kilgore, La Ward, Odessa, Pampa, *San Antonio, Sundown, Wichita Falls, Winnsboro. (**Office only.*)

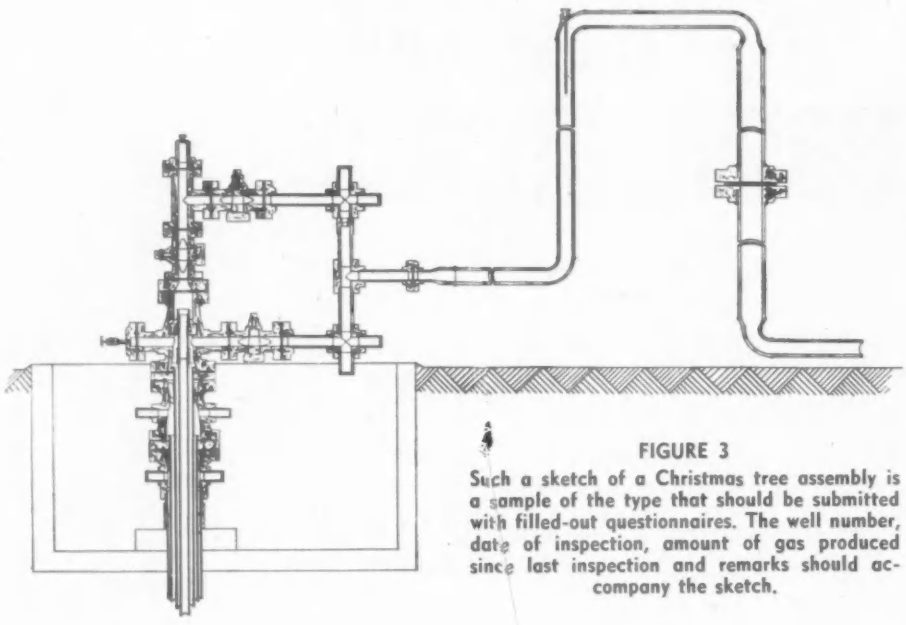

FIGURE 3

Such a sketch of a Christmas tree assembly is a sample of the type that should be submitted with filled-out questionnaires. The well number, date of inspection, amount of gas produced since last inspection and remarks should accompany the sketch.

cussing theories of causes of this corrosion were presented at the annual convention of the National Association of Corrosion Engineers held in Houston, April 10-12, 1944[7,8]. Both authors ascribed the corrosive attack primarily to the presence of carbon dioxide in the produced gas, but one author[8] indicated that, in his opinion, other conditions, such as rate of flow of gas, and fluid film behavior at high flow rates, would possibly affect the rate of corrosive attack. Further development of these theories is desirable, but any satisfactory theory must explain all of the anomalies of behavior that have been indicated above, and must stand the test of explaining field observations.

The Natural Gasoline Association of America has recently appointed a committee to study this corrosion problem. This committee has concluded that the problem is of such magnitude that the industry should superimpose a centralized research program on the various individual research efforts that are under way at present. It should be emphasized in this connection that all existing work by individual companies and by various committees of the petroleum industry should be continued to the utmost. However, the detached viewpoint of a commercial research institute should be of value in considering this problem. The Natural Gasoline Association of America has retained the Battelle Memorial Institute, of Columbus, Ohio, to initiate this research work. The Natural Gasoline Association of America is also considering the retention of other organizations or individuals to assist in this research program. This work will be financed by direct contributions from interested companies. Such a program should permit a more rapid solution of the problem than any suggested alternative procedure, and speed in the solution of this problem is extremely desirable. Full cooperation of the industry with the research groups selected will, of course, be essential as the research groups must have full access to all facts regarding field operations to work most efficiently. Also, field samples will be required, and many field tests of processes and equipment will probably be required before a final answer is reached. Difficulties to be encountered in this proposed program of research are still largely unknown, and it is impossible to estimate the time required for satisfactory completion of this work at present. The problem does appear presently to be of such magnitude that its solution will require several years, and the program of attack should be based on that assumption. But, until this problem is satisfactorily solved, this new form of high-pressure corrosion will continue to offer a serious hazard to life and property, and will be of direct concern to every operator of a high-pressure gas well.

Conclusions

The problem of corrosion of high-pressure production equipment is a very real problem insofar as the petroleum industry is concerned.

Information regarding the exact causes of this corrosion is not presently available.

No generally satisfactory methods of combating this corrosion have been proven.

The problem can best be attacked by the cooperative efforts of the petroleum industry.

Acknowledgment

Acknowledgment is made to the members of the API Southwestern District tropical committee on materials for their valuable cooperation in furnishing data used in the preparation of this paper. The kindness of L. T. Potter and E. A. Brown, of Lone Star Producing Company, in reviewing the paper and offering constructive suggestions is also acknowledged.

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APPENDIX

High Pressure Well Corrosion Field Data Questionnaire

1. Name of firm.
2. Name of field.
3. Total number of wells in field.
4. Total number of wells showing corrosion.
5. Cost of corrosion in this field (including cost of any protective measures employed)
   Actual—to date
   Future—$ per year estimated
6. Description of protective measures employed.

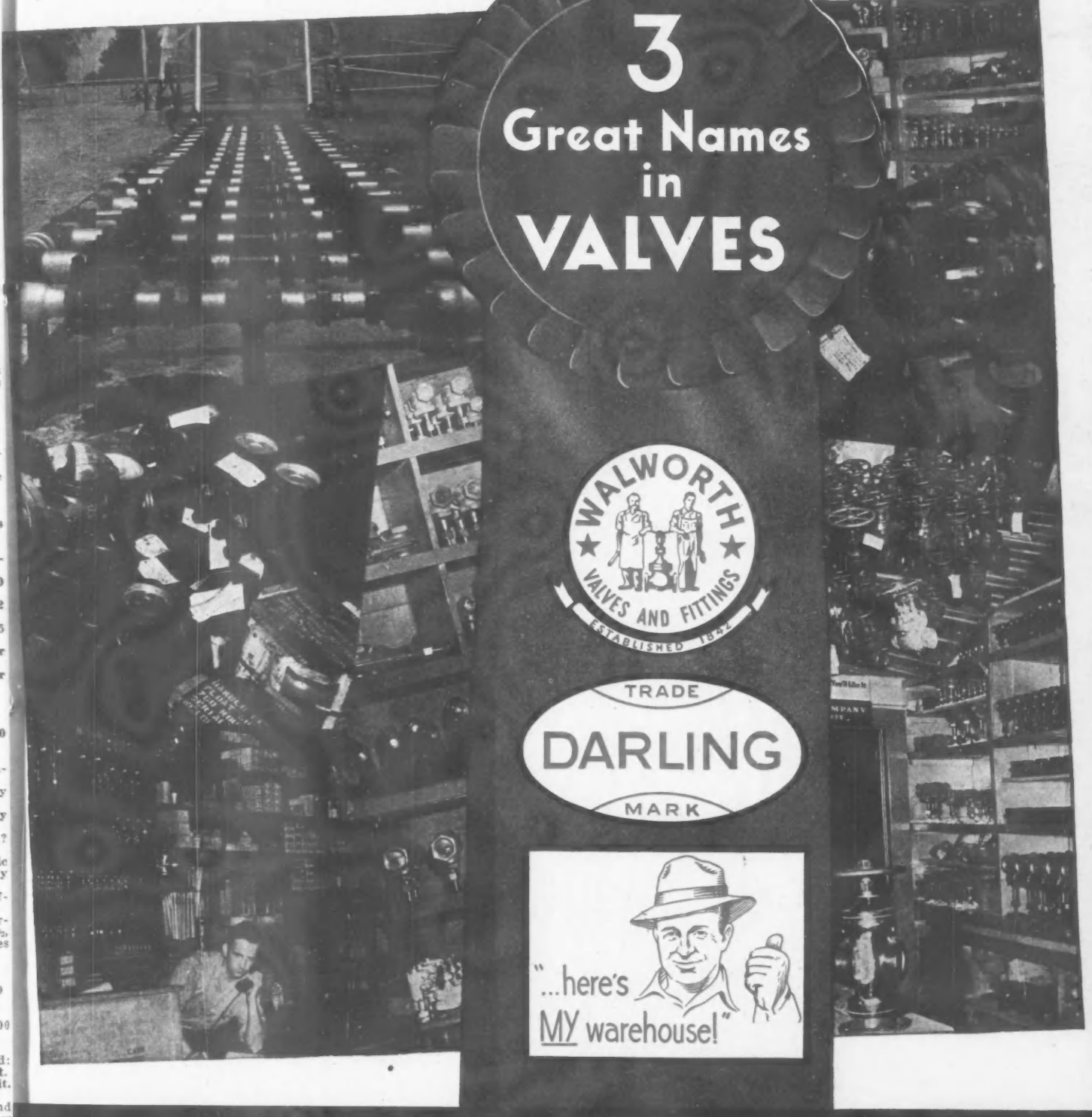
HIGH PRESSURE WELL CORROSION INDIVIDUAL WELL DATA QUESTIONNAIRE

(Data given in **blackface** below indicates general range of conditions in corroded wells reported to date).

1. Name of firm.
2. Name of field.
3. Well number.
4. Date of completion of well.
5. Geographical location of well with respect to field boundary (inclose sketch).
6. Structural location of well (inclose sketch).
7. Producing formation.
8. Producing depth: **4000-12,000 feet.**
9. Reservoir temperature: **150-250 degrees Fahrenheit.**
10. Reservoir pressure: **1600-5000 pounds.**
11. Well head operating temperature: **110-180 degrees Fahrenheit.**
12. Well head operating pressure: **1500-4500 pounds.**
13. Daily gas production rate—tubing: **1-12 million cubic feet per day.**
14. Daily gas production rate—casing: **5-25** million cubic feet per day.
15. Distillate content: **15-100 barrels per million cubic feet.**
16. Liquid water content: **0.3-2.5 barrels per million cubic feet.**
17. Gas analysis:
    A. CO_2: **0.6-2.0 percent by volume.**
    B. O_2: **0.0 percent by volume.**
    C. H_2S: **less than 1.0 grains per 100 cubic feet.**
18. Water analysis:
    A. pH at atmospheric press.—fresh sample: **4.8-6.6.**
    B. pH at atmospheric press. of 7-day old sample: **4.5-6.0.**
    C. Color of fresh sample: **Normally crystal clear.**
    D. Does fresh sample contain sediment? **Normally no.**
    E. Color of 7-day old sample: **Ferric hydroxide precipitate generally present.**
    F. Has precipitation occurred during 7-day period? **Normally yes.**
    G. Complete water analysis with particular attention to dissolved CO_2, total and dissolved iron, chlorides and total solids.

Constituent	P.P.M.
Fe	100—1000
Ca	100—10,000
Mg	5—100
SO_4	0—100
Cl	0—100,000
CO_2	0—200
HCO_3	50—300

19. Distillation curve on distillate produced: Initial B.P.: **50-130 degrees Fahrenheit.** Final B.P.: **500-700 degrees Fahrenheit.** Gravity: **45-80 degrees.**
20. Well head sketch showing location and sizes of valves, I.D. of tubing, casing, flow lines, etc. **(See Figure 3 for one type of Christmas tree assembly.)**
21. Does well show visual evidence of internal corrosion? Describe, and indicate location of corrosion on well head sketch. **(See general discussion.)**
22. If well produces oil and does not produce distillate:
    A. Gas-oil ratio
    B. Oil production—barrels per day
    C. Gravity of oil
    (No information available on corroded oil wells.)
23. Has any part of this well failed in service due to internal corrosion? **(See general discussion.)**
24. Has any part of this well required replacement due to internal corrosion? If so, list and describe. **(See general discussion.)**



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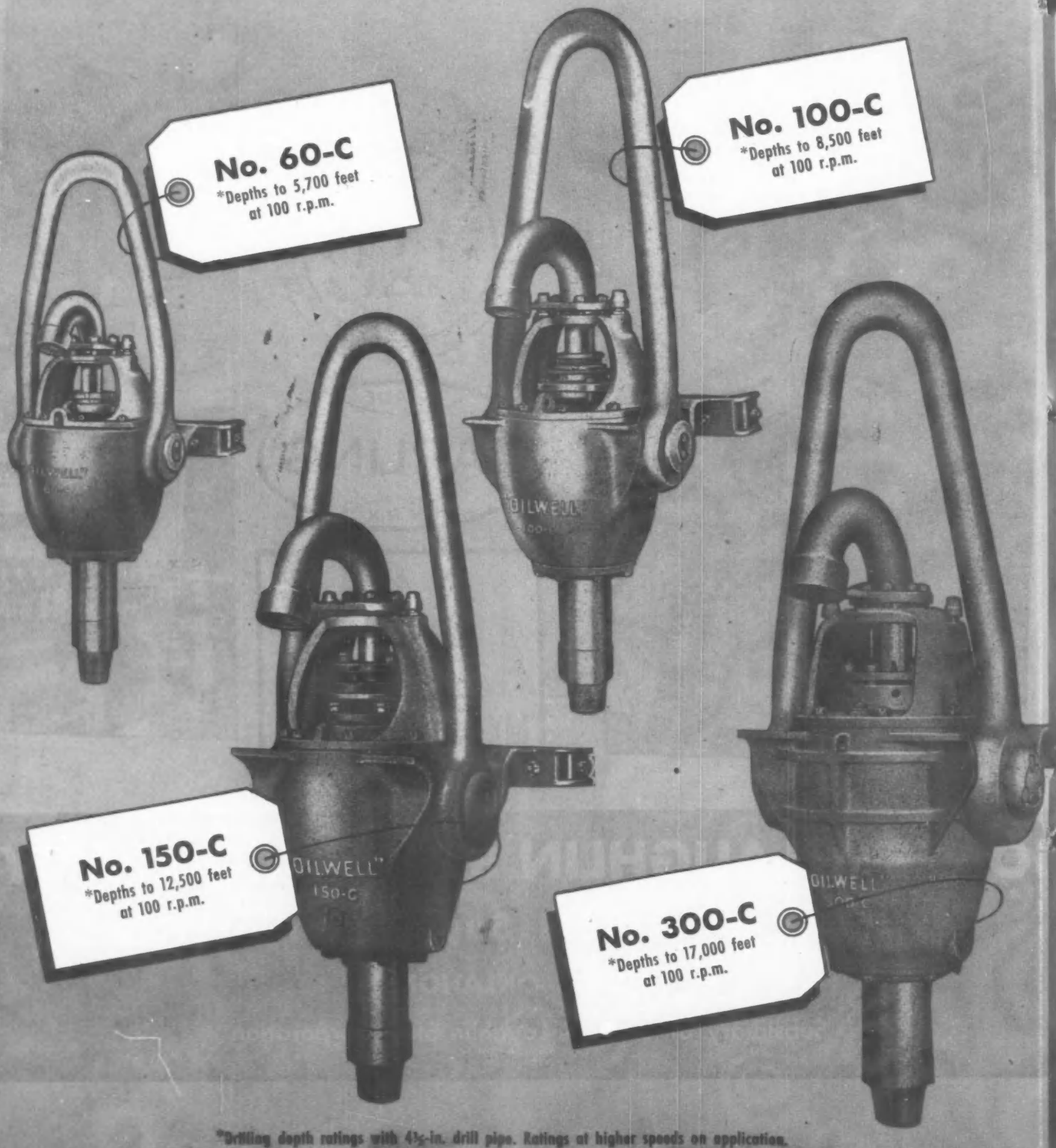

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Heavy-duty roller bearings—Full-apex type main thrust bearing,especially designed for its application. Test runs indicate its capacity to be many times the oilfield rating of the swivel. A tapered-roller auxiliary bearing in the housing cap absorbs upward thrust and takes part of the radial load. A straight-roller radial bearing is located at the bottom of the housing. Wide spacing of the two bearings carrying the radial load assures maximum stability.

Circulating oilbath lubrication—All bearings are immersed in the circulating oilbath. Two grease-lubricated oil seals at the bottom of the housing prevent loss of lubricating oil. Two large weatherproof breathers contribute to cool operation.

Heat-treated forged-steel body with integral tool-joint pin—Large-diameter fluid passage. A left-hand A.P.I. tool-joint pin is cut directly on the body, with ample stock for re-threading.

Di-Hard wash pipe—Abrasion-resisting lining of Di-Hard bonded to the inside protects the wash pipe from the cutting action of the fluid. A ground-and-polished armor of Di-Hard bonded to the outside greatly extends the wear-life of both wash pipe and packing.

Streamlined one-piece cast-steel housing—Provides rigid support for all working parts and prevents distortion under heavy loads. Trunnions, bail rests and elevator- link rest are integral with the housing.

Self-sealing wash-pipe packing—Requires no adjustment. A conveniently located fitting facilitates lubrication with waterproof grease.

Shock-absorbing and wear-preventing link-rest pads — Protect the swivel and the links from destructive hammering of metal against metal. Integral ears prevent the links from sliding off the pads.

Large-diameter heat-treated forged-steel bail — One-piece construction with increased thickness at the top to compensate for hook-wear and give extra strength.

One-piece cast-steel housing cap—Provides utmost accessibility to the wash-pipe stuffing box. When the cap is removed, the body and the bearings can be withdrawn or installed easily through the top of the housing.

Long-radius heat-treated cast-steel gooseneck—Enlarged fluid passage at the bend decreases fluid velocity. This feature combined with long radius reduces flow-restriction and fluid-cutting.

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Industry Operates at Record Levels To Fill Great Needs

Demand for all oils 9.6 percent larger in April than in that month last year, and crude runs to stills and production show about same gains; increases over 1943 are becoming smaller as year advances

By L. J. LOGAN, Associate Editor

DEMAND for petroleum products has continued to run materially higher than ever before, and in meeting the heavy requirements, there has been record-breaking processing of crude at the refineries. The large volumes of crude have been made available by domestic production around the highest recorded levels and by indicated relatively large imports.

As compared with trends of last year, however, the increases for 1944 are becoming smaller as the year advances, because the 1943 trends were sharply upward, while this year's curves started at high levels and are continuing the rises at gentler angles.

Statistics given herewith indicate that for the month of April, 1944, the total demand for all oils was about 9.6 percent greater than demand in April last year; while for the first 4 months the increase was 15 percent, on a daily average basis. As the year proceeds, there is to be expected further narrowing of the gains for individual months and consequent reduction of the increase for this year as a whole.

In one of its periodic reports some time ago, the Petroleum Industry War Council's committee on petroleum economics estimated total domestic and export requirements for all oils in 1944 at 1,825,242,000 barrels, an average of 5,000,000 barrels daily and an increase of 9.3 percent over the 1,670,605,000 barrels (4,600,000 daily) of total demand in 1943.

Making possible this year's unprecedented consumption of petroleum products has been the war time expansion of refining capacity and the prompt utilization of the new capacity along with the old. U. S. refining capacity has been rated at 4,903,000 barrels daily for several months, and in April, actual runs averaged close to 4,400,000 barrels daily or nearly 90 percent of potential, in spite of some decline from the previous month's rate. In the first 4 months of this year, runs to stills have averaged 4,375,000 barrels per day, an increase of 20 percent over the 3,646,000 daily of the like months last year. However, April runs were only 9.4 percent above those of April, 1943, in averaging 4,373,000 daily.

In supplying the extraordinary volumes of crude charged to refinery stills, there has been an indicated material stepping up of imports of crude as well as expansion of domestic production of crude. For the first 4 months of 1944, U. S. crude production averaged 4,413,000 barrels daily, therefore somewhat exceeding the runs to stills of 4,375,000 barrels daily, although this ratio meant that substantial volumes of crude for refiners had to come from foreign fields or storage, because considerable amounts of crude recorded as production are used direct for fuel or lost in handling. During the first 4 months of this year, crude storage was drawn upon to the extent of about 6,500,000 barrels (54,000 daily), and imports evidently were comparatively large. The domestic production of 4,413,000 barrels daily for January-April, inclusive, was 13.6 percent more than the 3,885,000 barrels per day of production in the like months last year. In April, 1944, domestic crude production averaged 4,466,000 barrels daily, an increase of 13.3 percent over the 3,942,000 daily of April last year.

While this year's unprecedented demand for oils has necessitated increased domestic production and imports of crude as well as some draft on crude stocks, the larger requirements have been met in part also by increased production of natural gasoline, which amounted to about 31,500,000 barrels in the first 4 months of 1944, an increase of 8.1 percent over the output in the like period last year.

The most noteworthy increase in demand for individual products this year

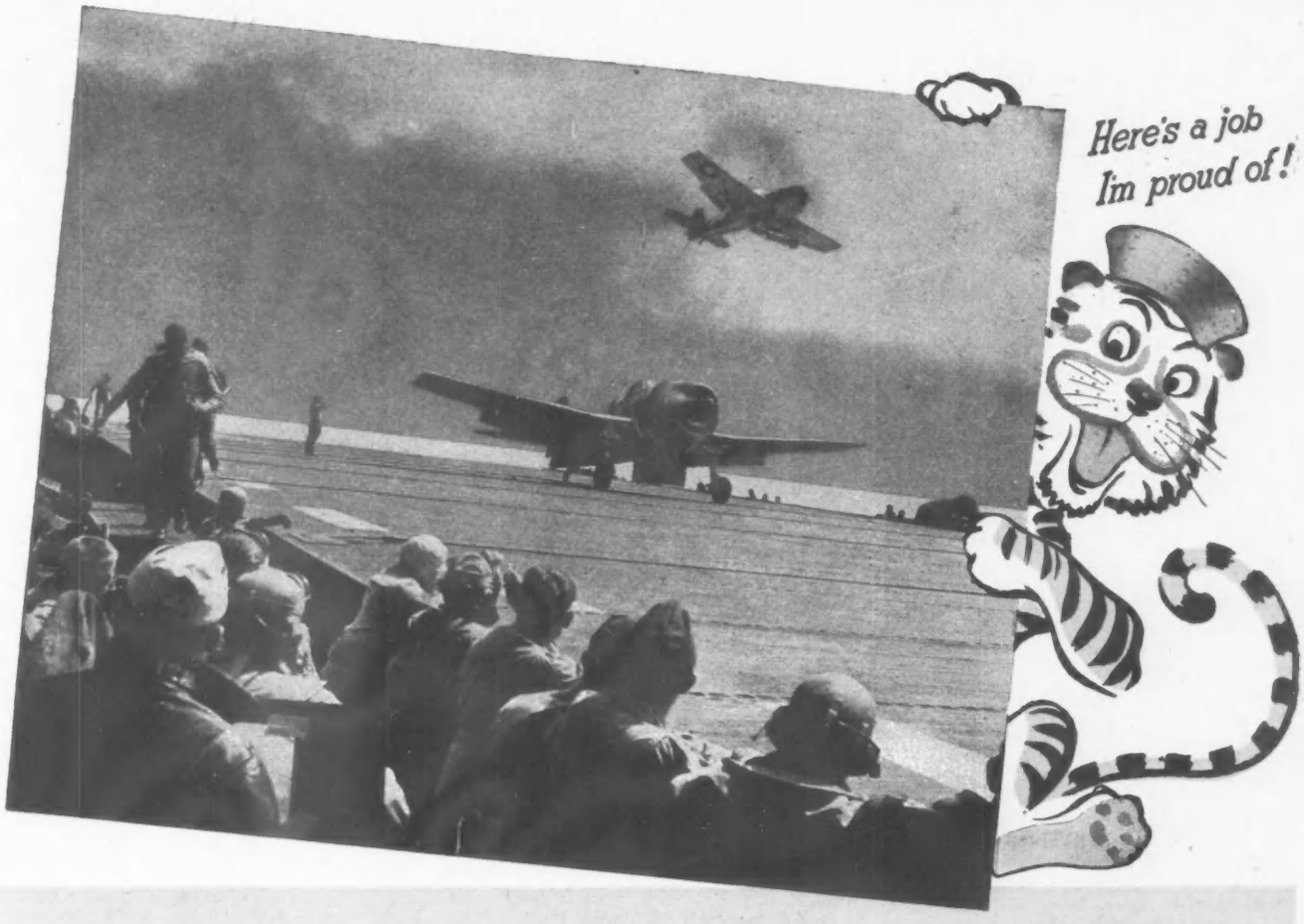
United States Crude Oil Production, by States

Source: U. S. Bureau of Mines, except April, 1944, estimated from A.P.I. weekly reports

THOUSANDS OF BARRELS

State or District	WARTIME FLUCTUATIONS IN DAILY AVERAGE CRUDE OIL PRODUCTION: Peak Before U. S. Entry in War Dec. 1941	Low After U. S. Entry in War April 1942	APRIL: 1942.	1943	1944	Percent Change '43-'44	TOTAL PRODUCTION OF CRUDE OIL: APRIL 1943	APRIL 1944	FIRST 4 MONTHS 1943	FIRST 4 MONTHS 1944	Percent Change
Alabama	.....	.....	.....	.....	0.05	+	.....	2	.....	4	+
Arkansas	74.3	71.6	71.6	71.2	79.5	+ 11.7	2,136	2,385	8,754	9,632	+ 10.0
California	631.9	637.5	637.5	773.8	829.1	+ 7.4	23,214	24,873	92,583	99,613	+ 7.6
San Joaquin Val.	261.3	269.7	269.7	362.6	388.0	+ 7.0	10,879	11,641	42,857	46,696	+ 9.0
Coastal District	87.4	72.3	72.3	105.5	126.9	+ 20.3	3,164	3,806	12,945	15,062	+ 16.4
L. A. Basin	283.3	295.5	295.5	305.7	314.2	+ 2.8	9,171	9,426	36,781	37,855	+ 2.9
Colorado	6.1	5.7	5.7	5.7	8.4	+ 47.4	170	252	696	903	+ 29.7
Florida	.....	.....	.....	.....	0.05	+	.....	1	.....	5	+
Illinois	397.8	301.6	301.6	230.5	211.9	— 8.1	6,914	6,357	28,377	26,235	— 7.5
Indiana	18.6	19.8	19.8	15.0	14.1	— 6.0	451	423	1,832	1,712	— 6.6
Kansas	256.7	249.8	249.8	311.0	266.8	— 14.2	9,331	8,004	36,990	32,815	— 11.3
Kentucky	12.7	11.9	11.9	18.8	21.6	+ 14.9	564	648	2,163	2,726	+ 26.0
Louisiana	347.4	306.8	306.8	345.6	358.4	+ 3.7	10,368	10,752	39,682	42,690	+ 7.6
North Louisiana	139.3	75.3	75.3	80.9	75.9	— 6.6	2,426	2,277	9,574	8,348	— 12.8
South Louisiana	208.1	231.5	231.5	264.7	282.5	+ 6.7	7,942	8,475	30,108	34,342	+ 14.1
Michigan	56.8	62.5	62.5	59.5	50.5	— 15.0	1,784	1,515	6,989	6,309	— 9.7
Mississippi	70.5	96.2	96.2	56.0	42.0	— 25.0	1,679	1,260	6,673	5,138	— 23.0
Montana	22.0	22.0	22.0	21.1	21.5	+ 1.9	634	645	2,420	2,830	+ 16.5
Nebraska	5.1	3.9	3.9	2.1	1.2	— 42.9	62	36	260	138	— 46.9
New Mexico	112.2	67.3	67.3	100.5	112.5	+ 11.9	3,016	3,375	11,726	13,732	+ 17.1
New York	15.1	15.3	15.3	14.2	13.1	— 7.7	427	393	1,687	1,560	— 7.5
Ohio	9.9	10.6	10.6	9.1	8.6	— 5.5	273	258	1,063	1,006	— 5.4
Oklahoma	427.6	389.6	389.6	340.2	333.0	— 2.1	10,205	9,990	41,421	40,045	— 3.3
Pennsylvania	49.3	52.7	52.7	45.0	41.6	— 7.6	1,348	1,248	5,354	4,863	— 9.2
Texas	1,532.3	1,081.0	1,081.0	*1,446.7	1,910.3	+ 32.0	*43,401	57,309	*165,864	*230,289	+ 38.8
E. Texas Field	386.2	225.4	225.4	319.8	362.3	+ 13.3	9,594	10,869	38,596	44,855	+ 16.2
Other E. Texas	86.1	78.7	78.7	99.7	127.2	+ 27.6	2,991	3,816	11,948	14,329	+ 19.9
North Texas	137.1	130.5	130.5	135.0	143.8	+ 6.5	4,049	4,314	16,166	17,149	+ 6.1
West Texas	303.4	185.8	185.8	214.4	374.0	+ 74.4	6,432	11,220	25,124	43,516	+ 73.2
Panhandle	92.1	83.5	83.5	91.0	91.1	+ 0.1	2,730	2,733	10,621	11,588	+ 9.1
Gulf, Upper	303.2	227.5	227.5	375.2	518.8	+ 38.3	10,220	15,564	39,415	62,603	+ 58.8
Gulf, Lower	126.9	82.6	82.6	117.3	198.0	+ 68.8	3,521	5,940	12,648	23,636	+ 86.9
Southwest Texas	78.2	48.0	48.0	54.5	75.3	+ 38.2	1,634	2,259	6,021	9,247	+ 53.6
South Central	20.1	19.0	19.0	16.7	19.8	+ 18.6	501	594	2,020	2,405	+ 19.1
West Virginia	9.8	10.4	10.4	9.5	8.8	— 7.4	285	264	1,137	1,047	— 7.9
Wyoming	82.2	85.4	85.4	91.1	93.7	+ 2.9	2,733	2,811	10,497	10,718	+ 2.1
Others	.2	.2	.2	.1	.1	.....	5	.....	18	11	— 38.9
Total U.S.	4,138.5	3,501.8	3,501.8	3,966.7	4,426.8	+ 11.6	119,000	132,801	466,186	534,021	+ 14.6

* Data by districts on A.P.I. Basis, and therefore do not agree exactly with Texas total.



Flaps down! Hook down! TIGER BRAND landing ropes up!

"It's no easy job landing on a carrier. It may be an 'airfield that floats' but it isn't the best landing strip in the world. You have only a very short distance in which to land, and stop. Long swells make the deck roll. You make a wide turn around the stern and head in. The landing officer draws a hand across his throat. Cut! You close the throttle and slap her down. The hook catches a landing rope, your wheels strike, and you are pulled to a stop. You're down!"

• • •

INDISPENSABLE part of the ingenious arresting gear that gentles a landing plane to a safe stop on a U.S. carrier's flight deck, American TIGER BRAND Wire Rope does its part in carrying our Navy's aerial punch to every far-flung corner of the seven seas.

Made of high-strength steel, the special TIGER BRAND Arresting Gear Rope (Excellay Preformed) was selected for the major share of these installations because it ideally combines the strength, stamina and flexibility vital for safety in this highly hazardous duty.

This application of TIGER BRAND is typical of many wartime uses in which our research and manufacturing departments have collaborated to produce wire rope to meet severe and unusual requirements. It is on the basis of such accomplishment that we can promise you in TIGER BRAND a better product than ever before, when wire rope again becomes fully available for civilian service.

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Excellay Preformed

UNITED STATES STEEL

has been that for motor fuel, in reflection of sharply higher use of aviation gasoline, although there has been continued large expansion in the requirements for residual fuel oil and gas oil and distillate fuel oil in supplying the navy and merchant marine. Kerosene, too, is being used in materially increased volume, with substantial volumes undoubtedly needed for war purposes.

The indicated demand for motor fuel in the first 4 months of 1944 was 221,691,000 barrels, an average of 1,832,000 barrels daily, or 26 percent more than the actual demand of 1,455,000 barrels daily in the like months of 1943. However, this great increase is not to be expected to extend on into the year. It reflects the unusual circumstances that demand in early 1943 was abruptly curtailed by tight rationing in advance of the subsequent heavy takings for military purposes, which were fully reflected in the early months of this year. However, by April of last year, that large military demand already was felt, and the indicated daily average demand for motor fuel in April of this year was only 6 percent above that in April last year, having been 1,928,000 barrels daily against 1,819,000. Production of motor fuel has been stepped up more than proportionally to the gain in demand, and especially in April and May the current production was sufficiently large to permit not only fulfillment of current demand but also some improvement in the inventory situation. While it is normal to draw heavily on gasoline stocks after April 1, there have been this year contra-seasonal accumulations of stocks in some weeks and subnormal withdrawals in most other weeks. In the month of April, 1944, while indicated demand was only 6 percent greater than in April, 1943, the production of motor fuel was 29 percent higher. Consequently, during April, 1944, there was an addition of 1,521,000 barrels to motor fuel stocks, whereas there had been in April, 1943, a with-

Stocks of Crude Petroleum in U.S., by Grades, at End of April, 1941-1944

(Data from Weekly Reports of U. S. Bureau of Mines in Thousands of Barrels)

Grade or Origin	END OF APRIL			
	1941 (May 3)	1942 (May 2)	1943 (May 1)	1944 (April 29)
Pennsylvania Grade	4,251	3,505	2,750	2,435
Other Appalachian	1,398	1,371	1,440	1,495
Lima-Michigan	1,069	1,498	1,088	930
Illinois-Indiana	22,010	17,694	11,116	14,729
Arkansas	2,949	3,044	2,334	2,933
Kansas	8,944	8,269	8,712	8,236
Louisiana	12,838	13,297	15,086	13,854
Northern	4,217	4,284	4,951	3,453
Gulf Coast	8,621	9,013	10,135	10,401
Mississippi	1,016	1,892	1,306	1,083
New Mexico	7,270	6,982	7,076	7,244
Oklahoma	61,483	50,195	38,304	32,910
Texas	86,639	95,980	105,940	114,243
East Texas	22,082	22,101	24,175	22,700
West Texas	16,056	23,582	24,521	29,831
Gulf Coast	23,457	25,937	29,747	33,557
Other Texas	25,044	24,360	27,497	28,155
Panhandle	.....	.....	5,835	6,187
North	.....	.....	7,335	6,278
South	.....	.....	4,856	5,495
Other	.....	.....	9,471	10,195
Rocky Mountain	15,453	16,498	13,648	9,500
California	37,737	38,129	34,054	23,965
Foreign	2,671	791	62	1,785
Total Gasoline Bearing in U.S.	265,728	259,145	242,916	235,342
Heavy in California	11,823	11,404	9,981	6,162
Total in U.S.	277,551	270,549	252,897	241,504

Production, Changes in Stocks, and Demand for Crude and Products

Bureau of Mines Statistics, with exception of data for April 1944, estimated with aid of A.P.I. bulletins. (Thousands of Barrels)

ITEM	APRIL					FIRST 4 MONTHS				
	1941	1942	1943	1944	Percent Change '43-'44	1941	1942	1943	1944	Percent Change '43-44'
ALL OILS										
Domestic Production, Total	117,050	111,564	126,371	140,801	+11.4	460,084	490,384	495,314	565,521	+14.2
(Daily Average)	3,902	3,719	4,212	4,693	+11.4	3,802	4,053	4,128	4,679	+13.3
Crude Oil	110,550	105,149	119,000	132,801	+11.6	434,303	461,992	466,186	534,021	+14.6
Natural Gasoline	6,225	6,215	7,371	8,000	+ 8.5	24,604	27,595	29,128	31,500	+ 8.1
Benzol	275	200				1,177	797			
Imports, Total	7,282					28,624				
Crude	3,831					13,816				
Refined	3,451					14,808				
Change in Stocks	—2,076	—13,576	—5,440	—3,668		—8,063	—18,510	—5,025	—15,050	
Stocks Beginning of Period	557,987	546,779	497,820	472,672		563,974	551,713	497,405	484,054	— 2.7
Stocks End of Period	555,911	533,203	492,380	*469,004	— 4.7	555,911	533,203	492,380	*469,004	— 4.7
(Days' Supply)	140	128	112	97	—13.4	143	126	118	98	—16.9
Demand, Excl. of Imports	119,126	125,140	131,811	144,469	+ 9.6	468,147	508,894	500,339	580,571	+16.0
(Daily Average)	3,971	4,171	4,394	4,816	+ 9.6	3,901	4,241	4,169	4,796	+15.0
Demand, Incl. of Imports	126,408					496,771				
CRUDE OIL										
Demand by Source—										
Domestic Production	110,550	105,149	119,000	132,801	+11.6	434,303	461,992	466,186	534,021	+14.5
(Daily Average)	3,685	3,505	3,967	4,427	+11.6	3,589	3,818	3,885	4,413	+13.6
Imports	3,831					13,816				
Change in Stocks, Refinable	—342	—4,374	+753	—1,188		—14,360	+12,077	—2,820	—6,420	
Stocks Beginning of Period	278,781	274,129	242,181	236,530		264,079	257,078	245,754	241,762	— 1.6
Stocks, End of Period	278,439	269,755	242,934	235,342	— 3.1	278,439	269,755	242,934	235,342	— 3.1
(Days' Supply)	75	74	62	53	—14.5	75	69	63	53	—15.9
Demand, Excl. of Imports	110,892	109,523	118,247	133,989	+13.3	448,663	474,069	469,006	540,441	+15.2
(Daily Average)	3,696	3,650	3,942	4,466	+13.3	3,708	3,918	3,908	4,467	+14.3
Demand Incl. of Imports	114,723					462,479				
Demand by Use—										
Runs to Stills, Total	111,106	104,962	119,945	131,188	+ 9.4	433,293	440,589	437,499	529,244	+21.0
(Daily Average)	3,704	3,499	3,998	4,373	+ 9.4	3,581	3,641	3,646	4,375	+20.0
Domestic	107,187	103,332				419,001	429,074			
Foreign	3,919	1,630				14,292	11,515			
Exports	2,503	5,670	7,199	6,500	— 9.7	7,449	19,115	21,853	25,400	+16.2
Transfers to Fuel Oil Stocks, Other Fuel, and Losses	1,644					6,083				
Demand, Excl. of Exports	112,750					439,376				
Demand, Incl. of Exports	115,253	110,632	127,144	137,688	+ 8.3	446,825	459,704	459,352	554,644	+20.7
(Daily Average)	3,842	3,688	4,238	4,590	+ 8.3	3,724	3,799	3,828	4,584	+19.7
MOTOR FUEL										
Production, Total	54,493	47,766	46,025	59,350	+29.0	211,253	212,673	183,194	233,371	+27.4
(Daily Average)	1,816	1,592	1,534	1,978	+29.0	1,746	1,758	1,527	1,929	+26.3
Imports	679					1,347				
Change in Stocks	—2,914	—4,658	—8,555	+1,521		+10,271	+9,661	+8,580	+11,680	
Stocks, Beginning of Period	96,832	104,915	89,539	79,664	—11.0	83,647	90,596	75,404	69,505	— 7.8
Finished Gasoline	91,501	99,295	84,077	75,275	—10.5	77,943	86,159	70,772	64,964	— 8.2
Natural Gasoline	5,331	5,620	5,462	4,389	—19.6	5,704	4,437	4,632	4,541	— 2.0
Stocks, End of Period	93,918	100,257	83,984	81,185	— 3.3	93,918	100,257	83,984	81,185	— 3.3
(Days' Supply)	49	57	46	42	— 8.7	57	60	58	44	—24.1
Finished Gasoline	88,414	94,214	78,559	76,786	— 2.3	88,414	94,214	78,559	76,785	— 2.3
Natural Gasoline	5,504	6,043	5,425	4,400	—18.9	5,504	6,043	5,425	4,400	—18.9
Demand (excl. small imports)	57,407	52,424	54,580	57,829	+ 6.0	200,982	203,012	174,614	221,691	+27.0
(Daily Average)	1,913	1,747	1,819	1,928	+ 6.0	1,661	1,678	1,455	1,832	+25.9
GASOLINE—Finished										
Production (straight run, cracked, natural blended)	52,009	45,889	44,540	57,353	+28.8	201,973	204,629	176,365	226,009	+28.1
(Daily Average)	1,734	1,530	1,485	1,912	+28.8	1,683	1,705	1,470	1,868	+27.1
†Percent Yield from Crude	43.7	39.9	35.3	39.9		44.9	34.0	33.8	38.8	
Imports										
Change in Stocks, Finished	—3,087	—5,081	—5,518	+1,510		+10,471	+8,055	+7,787	+11,821	
Stocks, Beginning of Period	91,501	99,295	84,077	75,275	—10.5	77,943	86,159	70,772	64,964	— 8.2
Stocks, End of Period	88,414	94,214	78,559	76,785	— 2.3	88,414	94,214	78,559	76,785	— 2.3
(Days' Supply)	48	55	47	41	—12.8	55	58	56	43	—23.2
Demand, (excl. small imports)	55,096	50,970	50,058	55,843	+11.5	191,502	196,574	168,578	214,188	+27.1
(Daily Average)	1,837	1,699	1,669	1,861	+11.5	1,596	1,638	1,405	1,770	+26.0
KEROSINE										
Production	6,068	5,529	6,299	6,678	+ 6.0	24,650	24,331	24,099	27,122	+12.5
(Daily Average)	202	184	210	223	+ 6.1	205	203	201	224	+11.4
Percent Yield from Crude	5.5	5.3	5.6	5.1		5.7	5.3	5.2	5.1	
Imports										
Change in Stocks	+339	—94	+458	+18		—2,449	—6,709	—4,738	—2,774	
Stocks, Beginning of Period	6,724	7,900	4,868	6,567	+34.9	9,512	14,515	10,064	9,359	— 7.0
Stocks, End of Period	7,063	7,806	5,326	6,585	+23.6	7,063	7,806	5,326	6,585	+23.6
(Days' Supply)	37	42	27	30	+11.1	31	30	22	27	+22.7
Demand	5,729	5,623	5,841	6,660	+14.0	27,099	31,040	28,837	29,896	+ 3.7
(Daily Average)	191	187	195	222	+13.9	226	259	240	247	+ 2.9
DISTILLATE FUEL OIL										
Production	14,692	14,002	16,690	19,424	+16.4	61,829	62,312	67,524	77,085	+14.2
(Daily Average)	490	467	556	647	+16.4	515	519	563	637	+13.1
Percent Yield from Crude	13.3	13.3	14.9	14.8		14.2	13.5	14.5	14.6	
Transfers from Crude	173	187	290	330	+13.8	803	779	956	1,155	+20.8
Imports	195					1,376				
Change in Stocks	+1,920	—1,413	—461	+310		—11,186	—21,134	—14,266	—11,492	
Stocks, Beginning of Period	29,805	30,205	31,135	29,926	— 3.9	42,911	49,926	44,940	41,728	— 7.1
Stocks, End of Period	31,725	28,792	30,674	30,236	— 1.4	31,725	28,792	30,674	30,236	— 1.4
(Days' Supply)	73	56	52	47	— 9.6	52	41	44	40	— 9.1
Demand, Excl. of Imports	12,945	15,415	17,741	19,114	+ 7.7	73,814	83,446	82,746	89,732	+ 8.4
(Daily Average)	432	514	591	637	+ 7.7	615	695	690	742	+ 7.5
Demand, Incl. of Imports	13,140					75,190				
RESIDUAL FUEL OIL										
Production	26,748	29,440	34,095	36,897	+ 8.2	108,249	114,194	130,138	151,647	+16.5
(Daily Average)	892	981	1,137	1,230	+ 8.2	902	952	1,084	1,253	+15.7
Percent Yield from Crude	24.2	28.0	28.7	28.1		24.9	24.7	27.9	28.7	
Transfers from Crude	520	1,826	1,837	2,391	+30.2	2,811	6,579	7,509	10,088	+34.3
Imports	2,968					12,005				
Change in Stocks	—2,496	—2,440	+101	—1,604		—10,166	—15,537	—4,402	—4,661	
Stocks, Beginning of Period	81,634	70,098	57,280	45,427	—20.7	89,304	83,195	61,783	48,484	—21.5
Stocks, End of Period	79,138	67,658	57,381	43,823	—23.6	79,138	57,658	57,381	43,823	—23.6
(Days' Supply)	80	60	48	32	—33.3	78	60	48	32	—33.3
Demand, Excl. of Imports	29,764	33,706	35,831	40,892	+14.1	121,226	136,310	142,049	166,396	+17.1
(Daily Average)	992	1,123	1,194	1,363	+14.1	1,010	1,136	1,184	1,375	+16.1
Demand, Incl. of Imports	32,732					133,231				

* Incl. 235,342 Refnble crude, 6,162 hvy crude in Calif., 4,400 Nat. gasine, 223,100 refd prods. †Straight run and cracked.

BACK in the '50s, folks considered Seneca Oil a cure for aching joints. Today, too, oil can cure many of Uncle Sam's wartime aches and pains. For petroleum is the keystone supporting our Victory drive. But petroleum production can keep pace with wartime demands *only* if new reserves are quickly discovered. . . . Accordingly, the petroleum geologist carries a tremendous responsibility. We of G. S. I. dedicate our services to him—to help solve the difficult problems that lie ahead.

GEOPHYSICAL SERVICE INC.

DALLAS, TEXAS

Sub-Surface Facts
ON THE
CONTROL OF FLOWING WELLS

No. 12 1944 DALLAS, TEXAS

SIMPLE TREATMENT FOR WELLS THAT "LOAD UP"

Installation of Bottom Hole Chokes in Wells That Frequently Load Up Has, in Most Instances, Caused Resumption of Steady Natural Flow That Continued for Many Months.

Bottom hole chokes have been used successfully to extend the flowing life of many wells from one to three years. However, for this operation to be successful, there must be some gas in solution that can be released by reducing the pressure of the flow stream in the lower end of the tubing string. Choking the flow stream near the bottom of the tubing instead of at the surface lets the liberated gas aerate and lighten the fluid column to such an extent that the bottom hole pressure will again cause steady flow.

Work caused by the expanding gas at the bottom of the hole is, therefore, utilized to lift the oil instead of being dissipated beyond the surface choke. Flow velocities in the lower section of the tubing string are greatly accelerated, resulting in more efficient flow action.

The feature that makes this operation so practical is that only a few hours are required to install or remove the bottom hole choke. The complete operation is done under pressure on an ordinary steel measuring line without in any way moving the tubing or affecting reservoir pressures.

Over 10,000 various bottom hole choke installations have been made to date at depths varying from a few hundred to 11,000 feet and under surface pressures ranging as high as 5,800 p.s.i. This extended use under all conditions of pressure, temperature, depth, etc., is the best possible proof of the tool's locking device, packoff elements, removability, etc.

OTHER PRINCIPAL USES

Other purposes for which the Type B Choke is most generally used are as follows:

(1) To Prevent Freezing of Surface Controls

When the point of pressure control is moved to a sub-surface level, the tubing string is made to act as a "mile-long heater" that utlizes the natural formation temperature to counteract the temperature loss due to gas expansion across the choke.

(2) To Reduce Gas-Oil Ratios

The use of bottom hole chokes for this purpose has been very successful in wells having fluid levels that stand a reasonable distance up in the tubing string. By equipping a choke with a bean that has a capacity which is less than the capacity of the formation to produce oil, and setting this choke below the fluid level, a fluid seal may be set up that retards the entrance of free gas into the well bore.

(3) To Retard Water Encroachment

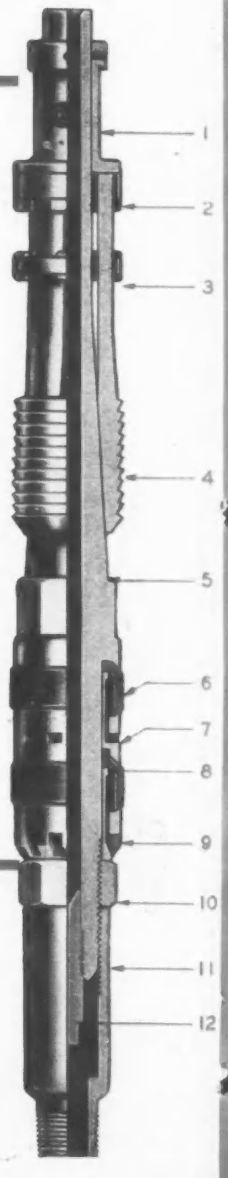
By installing a bottom hole choke with a flow bean that gives the optimum desired rate of flow, a constant bottom hole pressure is maintained. This optimum rate of flow cannot be exceeded unless the choke is first pulled from the well. This operation therefore tends to stabilize and hold consistent the water-oil contact.

(4) To Plug Tubing

The Type B Choke equipped with a blank ground seat bean is used extensively to plug tubing so that tubing connections can be changed or tubing pulled under pressure.

THE OTIS TYPE B REMOVABLE BOTTOM HOLE CHOKE

1. *Slip Carrier*
2. *Slip Carrier Band*
3. *Mandrel Band*
4. *Slips*
5. *Mandrel*
6. *Otis Sealing Cup*
7. *Upper Sealing Cup Ring*
8. *Cup Ring Packing*
9. *Lower Sealing Cup Ring*
10. *Cup Nut*
11. *Screw Bean Cage*
12. *Screw Bean*



OTIS PRESSURE CONTROL, INC.
DALLAS, TEXAS

Branches: Houston, Corpus Christi and Wichita Falls, Texas; Hobbs, N. M.; New Iberia, La.; Magnolia, Ark.; Oklahoma City, Okla.

Representatives: Otis Eastern Service, Inc., Wellsville, N. Y.; Western Pressure Control, Los Angeles and Bakersfield, Calif.

Export Office: 74 Trinity Place, New York City

drawal of 8,555,000 barrels, which was more than normal for the month. In its recent report the PIWC economics committee estimated total need for motor fuel in 1944 at 725,000,000 barrels, which would be 16 percent more than the 623,000,000 required in 1943. This forecast presages much smaller increases in demand over last year's trends than the 26 percent gain for the first four months. The demand apparently was only 6 percent above the year-ago trend in April, with the usual draft on stocks replaced by some accumulation, and gains for May and June were forecast by the Bureau of Mines at 16 and 14 percent, respectively. Meanwhile, there has been continued improvement in the motor fuel inventory situation, with production running high and drafts on storage comparatively low, and whereas stocks were 3.3 percent under the year-ago trend at the end of April, they were about 5.3 percent above that trend at the end of May.

Demand for residual fuel oil has continued exceptionally great, and while production has been held high, it has continued necessary to draw on badly depleted stocks. Production of residual in the first 4 months of this year was 15.7 percent greater than in the like period last year, on a daily average basis, and stocks were reduced about 4,500,000 barrels (37,500 daily) within the period, or about the same as last year, while transfers from crude to use as residual were substantially larger. These factors indicated daily average demand for residual was 1,375,000 barrels from January through April this year, or 16 percent more than the 1,-

• CONTINUED ON PAGE 52

U. S. Crude Runs to Stills and Percent of Refinery Capacity Used

Runs from Bureau of Mines except April, 1944, from A.P.I.; capacities from A.P.I.

THOUSANDS OF BARRELS

State or District	Peak Before U.S. Entry in War Oct. 1941		Low After U. S. Entry in War May 1942		Current Crude Runs and Use of Refinery Capacity Compared with Year Ago					Total Crude Runs to Stills in First 4 Months of Year		
					April 1943		April 1944					
	Runs Daily	Percent of Plant Capacity Used	Runs Daily	Percent of Plant Capacity Used	Runs Daily	Percent of Plant Capacity Used	Runs Daily	Percent of Plant Capacity Used	Percent Change in Runs April '43-'44	1943	1944	Percent Change
East Coast, Texas Inland, Texas Gulf, La. Gulf, Ark. and La. Inland	2,127	93.1	1,498	63.7	1,685	68.9	2,262	89.8	+34.2	197,445	268,883	+36.2
Appalachian	147	88.6	158	91.4	159	89.8	150	84.2	— 5.7	18,569	18,493	— 0.4
Ind., Ill., Ky., etc.	734	97.6	735	99.2	701	85.1	718	87.1	+ 2.4	85,151	90,817	+ 6.8
Okla., Kan., Mo.	368	89.1	359	86.1	348	83.7	347	83.0	— 0.3	40,884	42,076	+ 2.9
Rocky Mountain	94	69.1	91	65.2	93	63.3	105	70.5	+12.9	10,990	12,888	+17.3
California	618	78.5	605	78.3	745	91.2	791	96.8	+ 6.2	84,460	96,087	+13.8
Total United States	4,088	90.1	3,446	75.2	3,732	77.3	4,373	89.2	+17.2	437,499	529,244	+21.0

Stocks of Major Petroleum Products Held by Refining Companies in U. S. at End of April, Compared with Year Ago and 2 Years Ago

Stocks at refineries, at bulk terminals, in transit and in pipe lines. Data for 1942 and 1943 from Bureau of Mines monthly reports; for 1944 from weekly reports of American Petroleum Institute

THOUSANDS OF BARRELS

DISTRICT	FINISHED AND UNFINISHED GASOLINE Stocks End of April			KEROSINE Stocks End of April			GASOIL AND DISTILLATE FUEL Stocks End of April			RESIDUAL FUEL OIL Stocks End of April		
	1942	1943	1944	1942	1943	1944	1942	1943	1944	1942	1943	1944
East Coast, Texas Gulf, La. Gulf, N. La.-Ark., and Inland Texas	46,184	37,509	38,266	5,235	2,934	4,233	13,272	12,872	15,273	15,161	10,593	14,726
Appalachian	4,102	2,502	3,605	413	268	252	421	708	1,067	609	397	367
Indiana, Illinois, Kentucky	21,588	18,999	20,452	1,054	985	1,143	2,337	3,709	4,447	3,240	2,905	2,665
Oklahoma, Kansas, Missouri	9,926	6,807	8,662	462	500	321	937	1,647	1,437	1,389	1,379	1,219
Rocky Mountain	2,667	2,166	2,195	101	80	95	281	361	337	544	570	559
California	17,355	21,499	15,282	741	569	541	11,544	11,377	7,675	46,715	41,537	24,287
Total United States	101,822	89,482	88,462	8,006	5,326	6,585	28,792	30,674	30,236	67,658	57,381	43,823

Refinery Production of Major Products and Percent Yield from Crude Run, by Districts

Results in April and First 4 months, 1944, compared with like periods last year and in 1941, last prewar year for U. S. Table based on U. S. Bureau of Mines statistics, with exception of data for April, 1944, estimated with aid of A.P.I. weekly bulletins.

THOUSANDS OF BARRELS

DISTRICT AND ITEM	*Gasoline			Kerosine			Distillate Fuel Oil			Residual Fuel Oil			Lubricants		
	1941	1943	1944	1941	1943	1944	1941	1943	1944	1941	1943	1944	1941	1943	1944
East Coast, Texas Gulf, La. Gulf, North La., Ark., and Inland Texas															
Production, April	26,060	20,800	28,524	3,831	3,512	4,084	8,654	7,920	11,908	13,322	14,182	17,839	1,670	1,596	1,765
(Daily Average)	869	693	950	128	117	136	288	264	397	444	473	595	56	53	59
Percent Yield from Crude	42.9	35.5	38.2	6.7	6.9	6.0	15.0	15.7	17.5	23.1	28.1	26.3	2.9	3.2	2.6
Production, January-April	99,452	80,023	109,925	15,894	13,368	16,749	37,371	35,008	47,094	53,945	52,197	71,607	6,004	6,293	7,054
(Daily Average)	829	667	908	132	111	138	311	292	389	450	435	592	50	52	58
Appalachian															
Production, April	2,078	1,808	1,942	271	356	341	343	633	561	623	931	847	537	468	422
(Daily Average)	69	60	65	9	12	11	11	21	19	21	31	28	18	16	14
Percent Yield from Crude	47.0	37.2	42.4	6.3	7.5	7.6	8.0	13.3	12.5	14.4	19.5	18.9	12.5	9.8	9.4
Production, January-April	8,008	7,215	8,016	1,136	1,356	1,343	1,647	2,342	2,194	2,660	3,900	3,190	1,949	1,828	1,739
(Daily Average)	67	60	8,016	9	11	11	14	20	18	22	33	26	16	15	14
Indiana, Illinois, Kentucky															
Production, April	10,201	9,344	11,045	926	1,214	1,118	1,843	3,252	2,867	3,815	5,668	4,466	321	328	409
(Daily Average)	340	311	368	31	40	37	61	108	96	127	189	149	11	11	14
Percent Yield from Crude	50.8	41.6	48.3	4.9	5.8	5.2	9.7	15.5	13.3	20.2	26.9	20.7	1.7	1.6	1.9
Production, January-April	40,790	38,142	45,650	4,039	4,683	4,637	7,963	12,287	11,628	15,360	21,371	19,103	1,262	1,514	1,658
(Daily Average)	340	318	377	34	39	39	66	102	96	128	178	166	11	13	14
Oklahoma, Kansas, Missouri															
Production, April	5,450	4,526	5,257	681	916	638	1,033	1,585	1,520	1,803	2,246	1,834	326	426	374
(Daily Average)	182	151	175	23	31	21	34	53	51	60	75	61	11	14	12
Percent Yield from Crude	51.4	39.3	46.8	6.8	8.8	6.1	10.4	15.2	14.6	18.1	21.5	17.6	3.3	4.1	3.6
Production, January-April	21,554	18,113	21,520	2,512	3,195	2,832	4,394	6,767	5,832	7,067	8,969	7,677	1,199	1,283	1,502
(Daily Average)	180	151	178	21	27	23	37	56	48	59	75	63	10	11	12
Rocky Mountain															
Production, April	1,377	1,232	1,412	77	77	87	232	287	291	589	740	851	13	18	32
(Daily Average)	46	41	47	3	3	3	8	10	10	20	25	28	0.4	0.6	1
Percent Yield from Crude	48.2	42.5	42.6	2.8	2.7	2.8	8.2	10.2	9.2	21.4	26.4	26.9	0.5	0.6	1.0
Production, January-April	5,570	5,142	5,994	287	301	308	833	1,155	1,352	2,393	3,139	3,643	64	83	110
(Daily Average)	46	43	50	2	3	3	7	10	11	20	26	30	0.5	0.7	0.9
California															
Production, January-April	6,843	6,830	9,173	282	224	410	2,587	3,013	2,277	7,158	10,328	11,060	346	271	309
(Daily Average)	228	228	306	9	7	14	86	100	76	239	344	369	12	9	10
Percent Yield from Crude	32.7	25.8	32.3	1.6	1.0	1.7	14.7	13.5	9.6	40.7	46.2	46.6	2.0	1.2	1.3
Production, January-April	26,599	27,730	34,904	782	1,176	1,253	9,560	9,965	8,985	27,680	40,562	46,425	1,013	1,006	1,273
(Daily Average)	222	231	288	7	10	10	80	83	74	231	338	383	8	8	11
Total United States															
Production, April	52,009	44,540	57,353	6,068	6,299	6,678	14,692	16,690	19,424	27,310	34,095	36,897	3,213	3,107	3,311
(Daily Average)	1,734	1,484	1,912	202	210	223	490	556	647	910	1,137	1,230	107	104	109
Percent Yield from Crude	43.7	35.3	39.9	5.5	5.6	5.1	13.2	14.9	14.8	24.6	30.5	28.1	2.9	2.8	2.5
Production, January-April	201,973	176,365	226,009	24,650	24,079	27,122	61,768	67,524	77,085	109,105	130,138	151,645	11,491	12,007	13,336
(Daily Average)	1,683	1,470	1,868	205	201	225	515	563	637	909	1,084	1,253	96	100	111

* Production includes straight run, cracked, and natural blended at refineries. Yield indicates percent of crude runs made into straight run and cracked gasoline.

Daily Movement of Permian Basin Oil Sets New All-Time Record

Half million barrels is daily mark set by the 11 pipe lines that serve area. 10 percent increase in prospect soon when more effective use is made of all facilities. Small volume of wartime lines has been registering "most for the least" as 25 percent of flow goes to Big-Inch Longview terminal

By H. H. KING, Staff Writer

THE eleven trunk lines that serve the Permian Basin of New Mexico and West Texas have attained an all-time peak movement of 500,000 barrels daily, and facilities will be available within a few months to add 10 percent, or more to the outlet through more effective use of existing lines. About 25 percent of the current shipments are consigned to War Emergency Pipelines, Inc.'s 24-inch at Longview, East Texas. An aggregate of 120,000 barrels, or slightly less than 25 percent, is moving through 3 pipe lines routed via Oklahoma to refineries in the Middlewest, and by tank cars to a plant in the East. The remainder of the pipe-line shipments supply refineries at El Paso, San Antonio, Fort Worth, Dallas and the Houston-Beaumont district.

Refineries situated within and adjacent to the Permian Basin are absorbing about 50,000 barrels daily. This local demand for crude along with out-of-district shipments coincides with the June allowable production for the Permian Basin as requested by PAW and authorized by the two states.

Tank farms in West Texas contained 12,500,000 barrels of oil on May 1, representing a decline of 925,000 barrels during the preceding month. This backlog of stocks affords leeway for the carriers to operate at full schedules during production readjustment periods, which have been numerous in recent months as result of new outlets and shifting of tank-car loadings for Middlewest and East refineries from Midland, Texas, to Stanolind Pipe Line Company's Drumright terminal at Cushing, Oklahoma.

Wartime Expansion

The basin's share of wartime allocation of pipe and machinery to facilitate crude movement comprised two new trunk lines and the insertion of 75 miles of loops to make a double unit of an old line. These projects were completed within the past three months, and were originally scheduled to increase the transportation outlet by 119,000 barrels daily. This volume will be expanded to 147,000 barrels daily within several months since the owners of the two new carriers have been authorized to use more pumping equipment.

Production restrictions imposed by lack of transportation have been materially lifted in the Slaughter and Wasson fields, largest producing areas in West Texas with a combined aggregate of more than 100,000 acres, through the construction of Stanolind Pipe Line Company's 383-mile 16-inch carrier from Sundown sector of the Slaughter field to its terminal at Drumright, Oklahoma. This carrier made initial deliveries to the Oklahoma terminal on March 30, and has exceeded its rated capacity of 65,000 barrels daily with two mainline stations. Two more stations have been authorized, to boost capacity to 86,000 barrels daily.

Upon completion of the Sundown-Drumright line, Stanolind Pipe Line Company was delegated to supply the tank-car requirements of Middlewest and East refineries at an average rate of 50,000 barrels daily. This rail movement previously originated at Midland, Texas. The remainder of Stanolind

New Mexico Trunk Lines to West Texas

OWNER—	Gathering Line Terminal	Destination	Size Inches	Present Capacity Barrels	Pending Capacity, Barrels
Atlantic Pipe Line Co.	Hobbs	Midland	8	27,000	.....
Gulf Refining Co.	Monument	Wink	8	20,000	.....
Humble Pipe Line Co.	Hobbs	Wink	8	24,000	.....
Shell Pipe Line Corp.	Hobbs	Wink	8–10	30,000	.....
Texas New Mexico P. L. Co.	Jal	Crane	10–12	65,000	.....
Total	.....	.....	.....	166,000	.....
West Texas Trunk Lines					
Atlantic Pipe Line Co.	Midland	Atreco	10	41,000	.....
Gulf Refining Co., P. L. Div.	Midland	Ranger	(2)10	75,000	.....
Humble Pipe Line Co.	Kemper	Ingleside	10–12	65,000	.....
Humble Pipe Line Co.	Kemper	Webster	(2) 8	50,000	.....
Magnolia Pipe Line Co.	Midland	Beaumont	8	21,000	.....
Magnolia Pipe Line Co.	Midland	Corsicana	12	56,000	.....
Pasotex Pipe Line Co.	Wink	El Paso	8	18,000	.....
Shell Pipe Line Corp.	McCamey	Wood River, Ill.	10	46,000	.....
Shell Pipe Line Corp.	McCamey	Houston	10	37,000	.....
Stanolind Pipe Line Co.	Sundown	Drumright, Okla.	16	65,000	21,000
Texas, New Mexico P. L. Co.	Crane	Houston	12	65,000	.....
Total	.....	.....	.....	539,000	21,000
GRAND TOTAL				560,000 Barrels.	

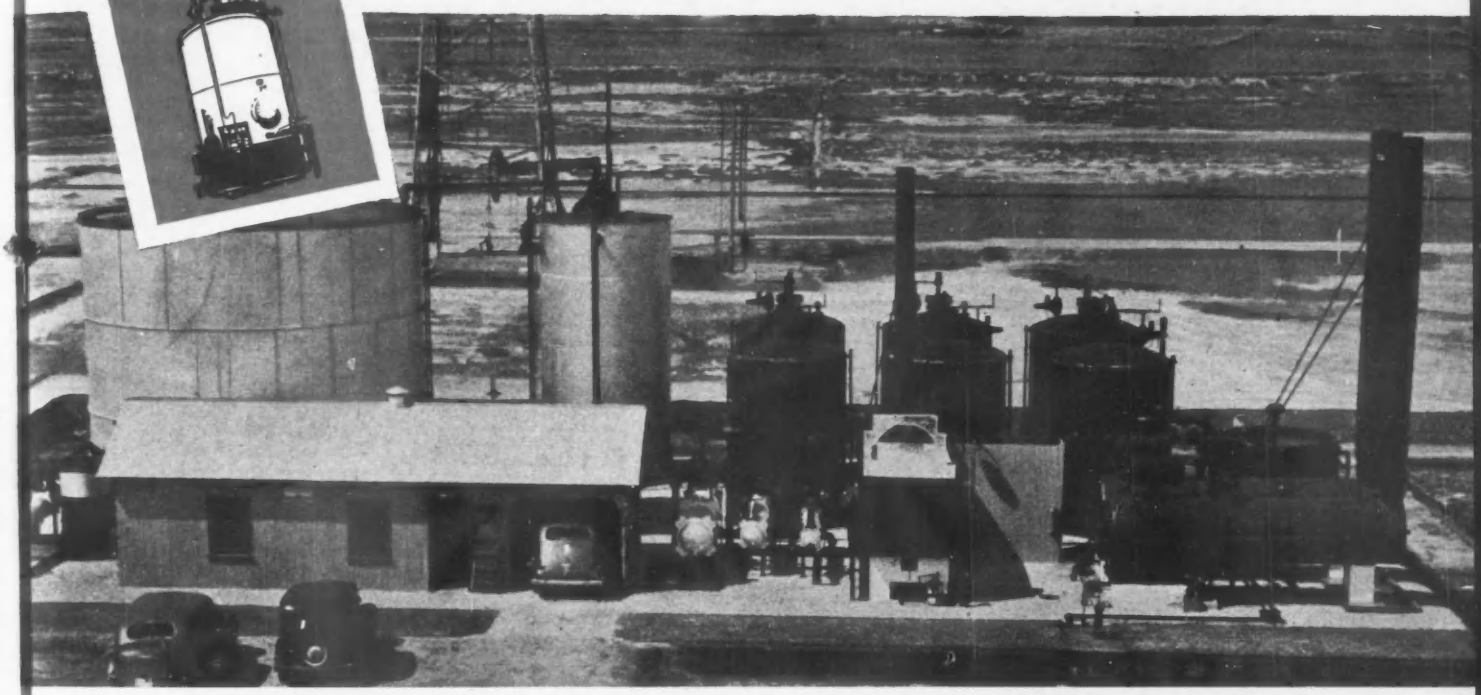
Permian Basin Refineries

OWNER—	Plant Site	Daily Capacity, Barrels
Southeastern New Mexico		
Continental Oil Co.	Artesia	1,200
Malco Refineries, Inc.	Artesia	3,500
McNutt Oil & Refining Co.	Brickland	1,500
New Mexico Asphalt & Refining Co.	Artesia	2,700
Valley Refining Co.	Roswell	2,400
Total	.....	11,300
West Texas		
Col-Tex Refining Co.	Colorado City	10,000
Cosden Petroleum Corp.	Big Spring	20,000
Gulf Refining Co.	Sweetwater	9,000
Mertzon Refining Co.	Mertzon	200
Motor Fuels Corp.	Levelland	6,000
Western Refining Co.	Baldridge	1,000
Wickett Refining Co.	Wickett	3,000
Total	.....	49,000

(2) Double system.

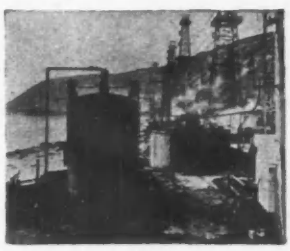
Petreco Dehydration CONDITIONS

CRUDE OIL SO THAT ALL DEPARTMENTS BENEFIT

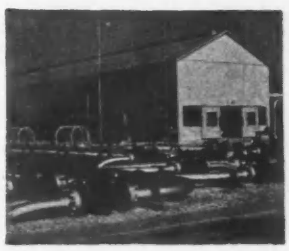


PRODUCTION

Petreco Electric Dehydration operating automatically, in vapor tight, A.P.I.—A.S.M.E. specification vessels, attains the lowest cuts, prevents extensive evaporation losses, retains true gravities and requires the minimum attention at all times.



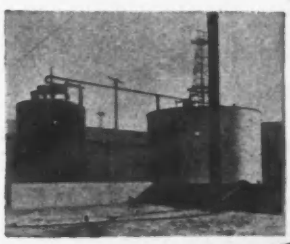
PIPELINE



Petreco processed crude contains the minimum of B. S. and W.—thereby preventing the accumulation of tank bottoms. Pumping operations are facilitated and pump pressures reduced.

TRANSPORTATION

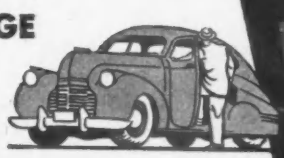
When crude oil is conditioned by the Petreco Process, the low residual moisture content insures maximum use of shipping facilities. With Petreco treated crude, you ship *oil*, not oil and water.



REFINING

The low B. S. and W. content of Petreco-processed crudes assures a minimum of moisture in the crude charge. This eliminates many refining complications due to poorly conditioned crudes.

COMPLETE OIL STATE COVERAGE WITH PETRECO PROCESSES



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Pipeline Company's basin crude deliveries into Drumright is relayed by pipe line to Standard Oil Company (Indiana) at Whiting, Indiana. The latter is converting additional refining capacity for processing this sulphur crude.

The Sundown-drumright line supplements its Slaughter field runs with receipts from nearby fields in Cochran County, and also from the Wasson field. The crude from the latter is relayed by Magnolia Pipe Line Company's 8-inch. The entry of Stanolind Pipe Line Company into the upper portion of the Basin with a big line solved a difficult transportation situation by reason of the two big fields being situated at ends of other lines that serve intermediate fields.

Relay Arrangement

Stanolind Pipe Line Company has operated on a nominal basis for some years in West Texas, having installed gathering systems in Winkler and Ward Counties to handle from 8000 to 10,000 barrels daily of select grades of Permian crude oil that yields lubricating oil stocks. This oil is transported by Humble Pipe Line Company in 250,000-barrel batches to the Ranger district, where it enters Stanolind Pipe Line Company's 8-inch sour-oil unit of its Mid-Continent multi-unit system on consignment to Standard Oil Company (Indiana). This relay arrangement will be continued until a substitute supply of lube stock material becomes available within reach of the 16-inch line, although it may not be practical to accumulate stocks and batch same.

A reshuffle of pump station equipment in service on Magnolia Pipe Line Company's original 8-inch trunk line from Midland via Corsicana to Beaumont, and the parallel 12-inch from Midland to Corsicana will increase the latter from 42,000 barrels to 56,000 barrels daily, while the smaller unit will be cut back from 28,000 barrels to 21,000 barrels daily. Upon completion of the 12-inch with three booster stations last March, the company was designated to batch oils of special military value along with so-called sweet oil from deep areas in Andrews, Winkler and Pecos Counties through the smaller unit. Lube stock materials from Lea County, New Mexico, also are on the preferred list.

The total volume of preferred crude oils is not sufficient to maintain capacity load on Magnolia Pipe Line Company's 8-inch, which has 13 stations between Midland and Corsicana. The company is tying in 7 stations by changing the manifolds to make use of this motive power in raising the capacity of the larger line to 56,000 barrels daily. The change over is underway, and when completed the company will transport 10,000 barrels of common-stock material daily for Humble Pipe Line Company on consignment to the War Emergency Pipelines, Inc.'s 24-inch. This oil will be delivered to Humble Pipe Line Company's Mildred station, near Corsicana, then relayed by the latter to the Big-Inch at Longview. Magnolia Pipe Line Company delivers 5000 barrels of West Texas oil daily to The Texas Pipe Line Company at Corsicana for shipment to The Texas Company's refinery at Dallas. An equal volume is moved by Magnolia Pipe Line Company's Mid-Continent multi-unit system from Corsicana to the Fort Worth refinery of the Magnolia Petroleum Company. The remainder of the Midland-Corsicana oil movement is routed to Beaumont, including 10,000 barrels daily to Sun Pipe Line Company on consignment to the Big-Inch at Longview.

Completion of 75 miles of 10-inch loops early in May by Gulf Refining Company provided it with a two-unit system from the Midland district to Ranger, plus four short triple units, aggregating 25 miles, so as to balance pressure in hilly terrain. These new loops boosted the capacity out of Midland station to 85,000 barrels daily, operating at 750 pounds pressure, and 75,000 barrels daily into the Ranger terminal. The difference represents space set aside for supplying the company's refinery at Sweetwater, between Midland and Ranger.

Enlargement of the Permian Basin outlet has enabled Gulf Refining Company to deliver 20,000 barrels daily to the Big-Inch's Longview terminal. This oil is diverted at Weatherford junction, Ranger district, to an 8-inch unit that extends via Fort Worth to Saltillo, thence southeast to tie into the Big-Inch's East Texas feeder lines. The Weatherford-Saltillo line was inactive for lack of crude until the company expanded its shipments from the basin.

Near Capacity Operation

All lines from the Permian Basin are operating at capacity, except the largest of two systems owned by Humble Pipe Line Company. The company's combination 10- and 12-inch line from Kemper terminal to Ingleside, near Corpus Christi, is rated at 65,000 barrels daily, but is only handling from 35,000 to 40,000 barrels daily. It supplies Humble Oil & Refining Company's skimming plant at San Antonio, and has a quota of 30,000 to 35,000 barrels daily for the Big-Inch. The latter commitment is routed via the Southwest Emergency Pipeline, Inc., from Corpus Christi to Houston, then relayed by reversed lines to Longview. Full utilization of the available capacity of the Kemper-Ingleside carrier is dependent upon tankers, or barges being provided to transport the oil from the coastal terminal to Houston or Beaumont. This transportation bottleneck may be eliminated shortly. Humble Pipe Line Company's double 8-inch line from Kemper terminal via Ranger district supplies Humble Oil & Refining Company's Baytown refinery, except for oil handled for Stanolind Pipe Line Company.

Shell Pipe Line Corporation has been the largest shipper of crude oil from the Permian Basin since wartime restrictions caused Humble Pipe Line Company to curtail operations on its Kemper-Ingleside line. The former operates 10-inch lines from McCamey terminal to Wood River, Illinois, and to Houston, at capacity loads, consisting of 46,000 barrels and 37,000 barrels daily, respectively. The Middlewest carrier also handles from 1800 to 2000 barrels daily of low-gravity oil produced in Baylor County in North Texas.

The Texas-New Mexico Pipe Line Company's 12-inch to Houston is the source of supply for sour oil used by The Texas Company's refineries at Houston, Port Arthur and Port Neches, and Sinclair Refining Company's plant at Houston. This carrier is operating at capacity load of 65,000 barrels daily, and is the only trunk line outlet for the Eddy County portion of New Mexico.

Atlantic Pipe Line Company's 41,000-barrel 10-inch from Midland to Beaumont is devoted to supplying the Big-Inch, making deliveries via the company's reversed East Texas-Beaumont 10-inch.

Pasotex Pipe Line Company's 8-inch carrier from Wink, Winkler County, to El Paso is operating near its capacity load of 18,000 barrels daily in supplying the El Paso refineries of Standard Oil Company of Texas, an affiliated unit, and The Texas Company.

Expansion Possible

No new trunk lines are likely to be built into the Permian Basin. Present facilities can be materially expanded to compensate for increased production through the installation of additional pump stations on some lines, and the looping of others. Stanolind Pipe Line Company's 16-inch can be boosted to 116,000 barrels daily by increasing the number of stations to 8, while additional stations can jump the capacity of The Texas New Mexico Pipe Line Company's 12-inch to 90,000 barrels daily. Additional loops and stations on Shell Pipe Line Corporation's trunk lines to the Coast and Middlewest could step up the company's runs to above 100,000 barrels daily.

Record Oil Demand

■ CONTINUED FROM PAGE 49

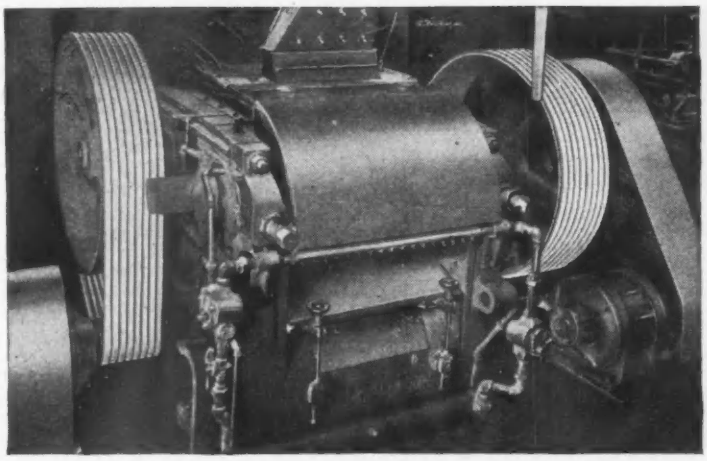
184,000 daily in the corresponding months last year, with figures for both periods not taking into account imports, which are probably up this year, along with crude imports. In April the demand continued high, having averaged about 1,363,000 barrels daily, 14 percent above April last year, with production up 8 percent and residual coming from storage.

Distillate fuel oil demand was 7.5 percent greater in the first four months of 1944 than in the like months last year. Production in similar comparison was up 13.1 percent, but stocks were not drawn upon as heavily. April showed no important variation from those longer-period changes, daily average demand having been up 7.7 percent and production up 16.4 percent. Stocks show no material change from a year ago.

Indicated demand for kerosene in the first 4 months of 1944 was about 3 percent greater than in corresponding months last year, with production up 11 percent but less taken from storage. In April the indicated demand was 14 percent higher than a year previously, with production up only 6 percent but with very little going to storage, in contrast with a substantial accumulation in April last year.

In reflection of continuing heavy demand for practically all petroleum products and the comparatively low levels of stocks of crude and products, the present inventories of all oils and of individual items generally represent fewer days' supply than were on hand a year ago.

Yields of the various products from crude processed at refineries continue to reflect relatively great need for both residual fuel oil and distillate fuel oil, the yields of both groups remaining above normal.



*

One TYPICAL EXAMPLE

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This is the record not of a few belts over a limited period but of thousands upon thousands of Gates synthetic rubber V-Belts installed in hundreds of plants and factories during the past 6 years.

Gates long headstart in fabricating V-Belts of synthetic rubber is of greater importance to you now than ever before because *all* the V-Belts furnished industrial plants today are of *synthetic rubber.*

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Preventing Core Contamination

Use of concentration of modified starch drilling mud found very effective

MORE analysts and technologists have been confronted with the problem of core contamination for many years. Extensive research work has been pursued in an effort to prevent flushing while coring or in trying mathematically to approximate the degree of core contamination by drilling water. Recent developments in water base drilling fluids appear to offer a method of preventing core flushing by drilling mud filtrate.

Only a few years ago, drilling mud having a water loss of 15 cc. per 30 minutes was considered to be a low water loss mud. The introduction of modified starch drilling mud additives has resulted in widespread use of drilling fluids having a fluid loss of 5 cc. per 30 minutes, or less. However, experienced core analysts have reported that, insofar as core contamination is concerned, the reduction of fluid loss from values of 15 cc. to 5 cc. has not been of value in reducing core contamination. Field and laboratory data have indicated that drilling muds having a fluid loss of less than 2.5 cc. are necessary to eliminate contamination.

One company recently utilized a 1 cc. per 30 minutes water loss starch mud for coring productive sands in a field development well in Oklahoma. The fresh water gel-type drilling mud used for drilling to the pay horizon was treated with modified starch to reduce the filtrate loss from 30 cc. to 1 cc. before coring the pay sands. After preparatory chemical treatment, the addition of approximately 20 pounds of starch per barrel of base mud yielded a drilling fluid having a water loss of 1 cc. per 30 minutes.

Comparison Given

A comparison of the characteristics of the base and starch muds is given in Figure 1. In connection with the viscosities indicated in Figure 1, it should be mentioned that the viscosity of a starch mud is a true viscosity and is not comparable with gel-type mud viscosities. The starch mud was always easier to handle with the pumps than the gel-type base mud.

Since the modified starch additive is collodial in nature, it is present in the drilling mud filtrate and acts as a tracer to permit evaluation of the extent of core flushing. Ninety-five feet of sand was cored with a recovery of 58 feet while circulating the 1 cc. water loss mud. The cores were checked for contamination by means of the familiar starch-iodine test. Starch-idoine analyses indicated that the cores were not contaminated except for a peripheral ring about 1/16 inch wide around the circumference of the core and in fracture planes existing in the sand.

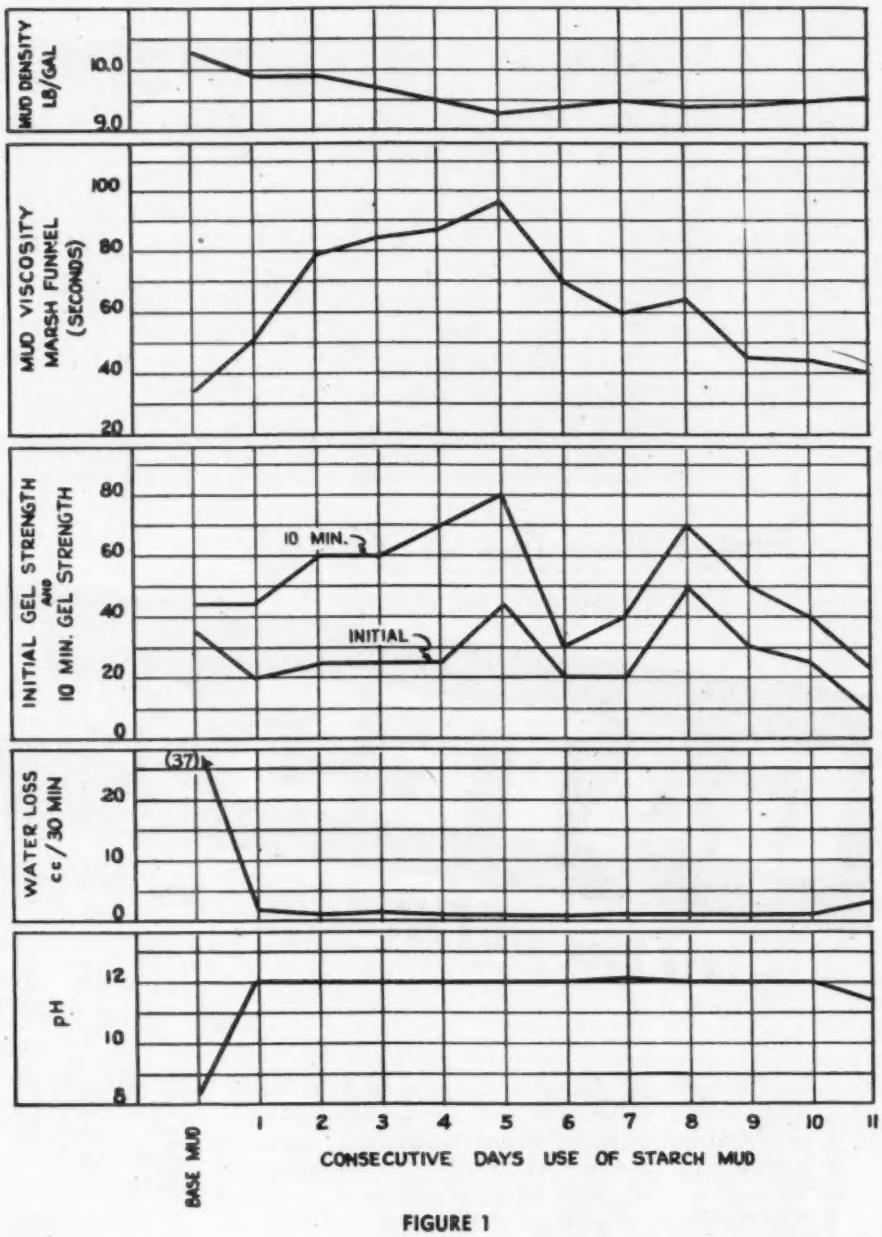

FIGURE 1

A comparison of the chloride ion concentration of the unflushed cores with flushed cores from an offset well further indicates the absence of drilling water contamination from the 1 cc. water loss drilling mud. Chloride ion concentration in the pore water of cores is known to vary with the porosity and permeability of the sample, so these data are included in Table 1 for comparison with the chloride ion concentration values.

TABLE 1
Comparison of Chloride Ion Concentration

	Porosity Percent	Permeability md.	Chloride Ion Concentration ppm.
Well A	25	800	2,880
(35 cc. per 30 minute	20	250	9,010
drilling fluid	5	.1	65,180
Well B	9	570	102,000
(1 cc. per 30 minute	18	310	175,000
drilling fluid)	11	47	130,000
	5	.1	255,000

Method of Prevention

Formation water samples in the area have a chloride ion concentration of about 105,000 ppm. The higher values of the pore water are indicative of a loss of water before analysis, and to find true connate water, the porewater concentration should be corrected so that the chloride values correspond with the known value of the formation water.

Results indicate the introduction of high concentration modified starch drilling mud offers a method of preventing flushing of cores by drilling mud filtrate.

Grateful acknowledgement is made of the assistance of Baroid Sales Division, National Lead Company, in preparing the data presented in this article.

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Preventing Core Contamination

Use of concentration of modified starch drilling mud found very effective

MORE analysts and technologists have been confronted with the problem of core contamination for many years. Extensive research work has been pursued in an effort to prevent flushing while coring or in trying mathematically to approximate the degree of core contamination by drilling water. Recent developments in water base drilling fluids appear to offer a method of preventing core flushing by drilling mud filtrate.

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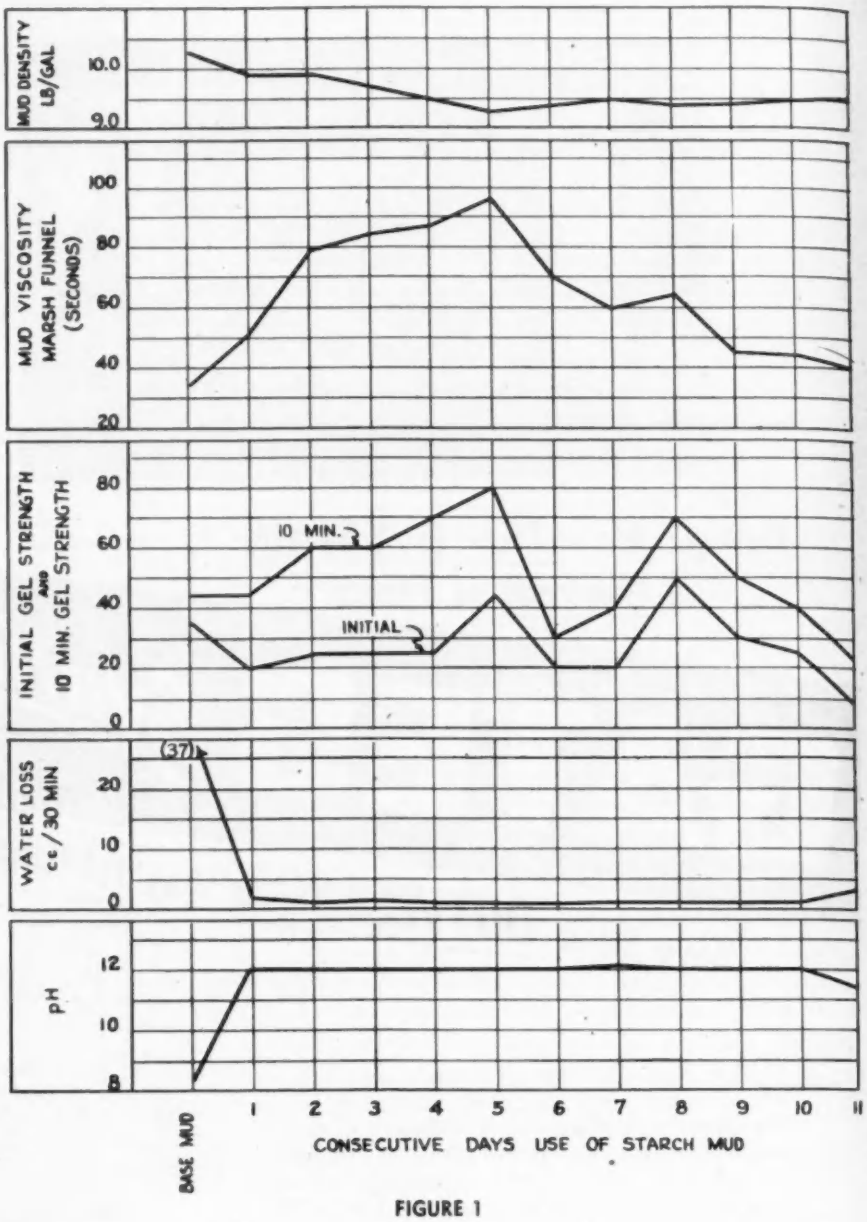

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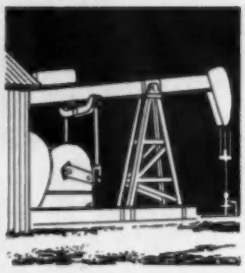


OPERATING HINTS *For Production Men*

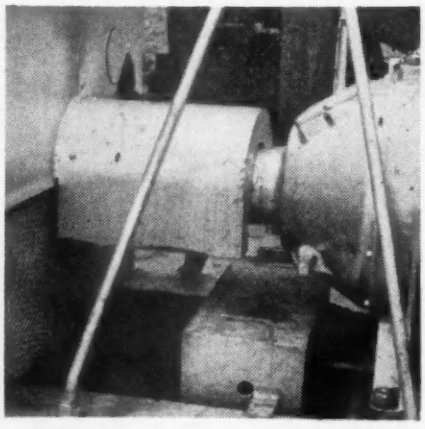
Universal Joint Cover Eliminates Accidents

The universal joint between engine and generator or other unitized auxiliary is a hazard which, even though apparently guarded by adjacent larger units, sometimes causes accidents when crewmen attempt to take a shortcut across the unit in an emergency.

SAFETY GUARD

Since there is expansion of the shaft and power unit in operation, and more or less vibration even in the most carefully mounted sets, a cover which attempts to bridge gap between transmission housing and driven-unit cannot be mounted rigidly on both.

One contractor forms a semi-cylindrical shield which fits over the universal joint, with an outer skirt or curtain which conforms closely to the radius of the transmission housing case, without actually contacting it. The shield is welded permanently to the end of the driven-unit housing, access to the universal being obtained by lifting off the entire end section of the housing.



Formed to span entire joint, universal cover is carried on only one housing for flexibility.

Tank steel used for the shield is heavy enough to deflect falling objects, and, being welded with continuous beads at both ends, serves to protect the universal from rain, wash water and other fluids which might contaminate or flush out the lubricant.

Collecting Tank Insures Adequate Suction Head

To provide positive suction head on the feed-water pumps, and also to provide anchorage for the skid, one contractor mounts a rectangular tank on the same base as the pumps, enabling all suction lines to be made up permanently and safeguarded against the disrupting effect of vibration.

BOILER WATER

The tank serves as sump for condensation from the various steam traps around the rig, and as intermediate water storage between treating unit (when the water requires chemical purification) and the pumps.

When moving equipment, the tank is emptied, and then becomes a convenient bin into which may be piled the valves, connections and short pipe bends required for hooking water supply to the boilers. The steel tank also serves to protect the pumps in some measure from damage from other equipment carried on the same truckload.

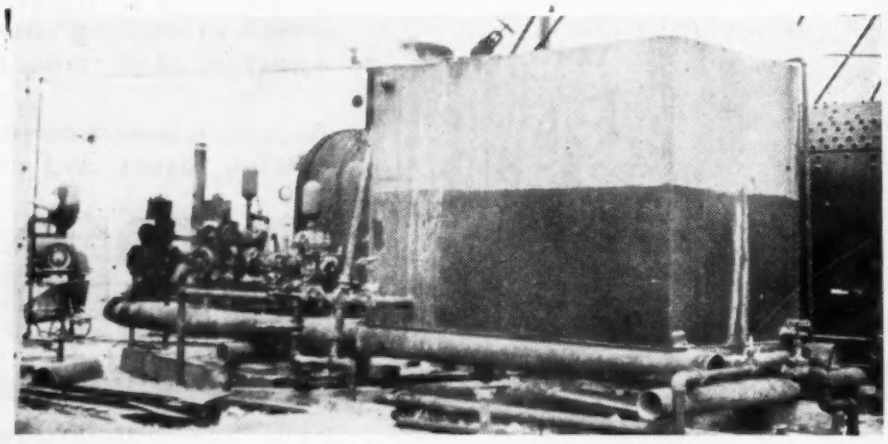
By using reinforcing webs of light plate within the tank, for protection when on the move, the steel used in this unit may be thin enough to reduce extra weight involved to point where trucking loads are not increased over normal.

Drop-Type Water Trap Clarifies Fuel Stream

Even though relatively clear of water when placed in the elevated storage tank, butane or diesel fuel may become contaminated with water simply through condensation of vapor sucked into the tanks with the air which replaces fuel drawn off.

FUEL SUPPLY

One company provides for gravity separation of this entrained water through a drop-leg unit of 6-inch pipe which is suspended on the fuel delivery line directly below the tank outlet. Fuel and water flow downward through the inlet pipe, which is carried some distance down into the cylinder formed by the 6-inch pipe. The retardation of flow, together with the change in direction, tend to accelerate the separation of the water and its progress toward the bottom of the unit, while the water-free fuel is drawn off through the side outlet near the top of



Mounted on skid with feed-water pump, this tank insures sufficient suction head, and also tends to anchor entire unit against shifting fostered by vibration of power units against heavy loads.

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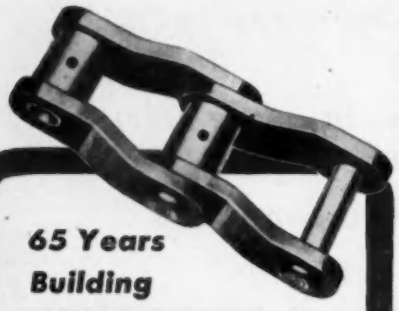

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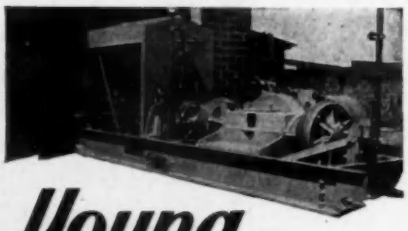

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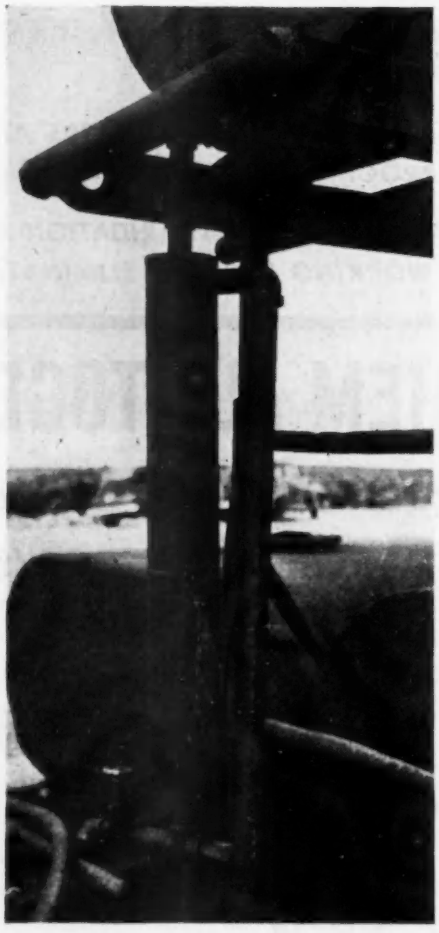
the cylinder, and goes thence to the strainers on the fuel delivery line.

A short nipple and valve at the bottom of the separator provide for drawing off the accumulation of water and heavy solids as required, the head of fuel above the drain being sufficient to insure thorough flushing of the conical bottom of the unit.



Enlarged section of fuel line, with submerged inlet and raised outflow, encourages water settling.

Extra Dead-line Strut Reinforces Substructure

That corner of the derrick which carries the dead line and, through it, is subjected to increased compressive stress every time the drawworks assumes a load, is reinforced by a brace to carry the derrick support directly over the sill at the point where the line turn is passed around the timbers.

DERRICK SUPPORT

This auxiliary footing is formed from a section of 6⅝-inch drill stem, which has been beveled at the proper angle and equipped with plate brackets and feet to conform to the sill and under side of the steel member carrying the derrick floor. To prevent possible spreading of the brace away from the derrick corner post, it is retained in place with a short loop of wire line, this latter is restrained from sliding up the slope of the brace by a lug welded across the outer surface, and tightened to afford the desired amount of tension by a turnbuckle made up in one side of the wire line loop.

Beveled and equipped with thrust plates, this piece of drill pipe absorbs stress of dead-line

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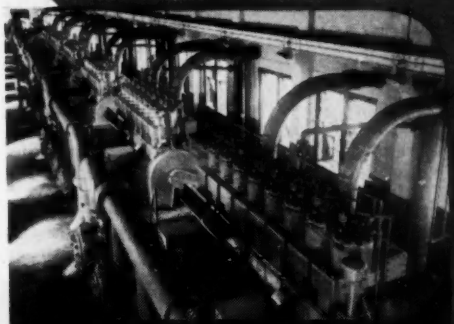
73,040 H.P.

OF CLARK "ANGLES" TO CALIFORNIA IN 4 YEARS . . . HALF OF IT IN 1943



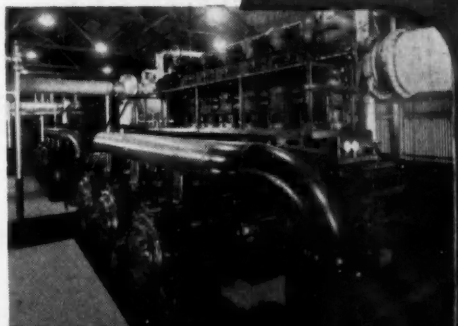
7 CLARK 1000 H. P. gas-driven "Angles" in refrigeration service in a California refinery

CLARK Compressors have had wide acceptance in California, due to their fine record there for continuous operation.

When the demand for compressors for Hi-Octane Gasoline developed, CLARK delivered the goods. Not a single shipment has been late.

Today, with the advent of deeper fields and lighter crudes, California operators are producing large volumes of gas and are in position to make use of the advantages that accrue from pressure maintenance. CLARK deliveries to California in the past 4 years, principally for refinery and pressure maintenance service, have totalled 73,040 Horsepower. Half of that total was shipped in 1943.

12 CLARK 7500 H. P. gas-driven "Angles" in service in California's Synthetic Rubber Industry



2 CLARK 3000 H. P. steam-driven "Angles" in California refinery making Hi-Octane Gasoline

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CLARK

Sets the Pace in Compressor Progress

OPERATING HINTS *For Pipeliners*

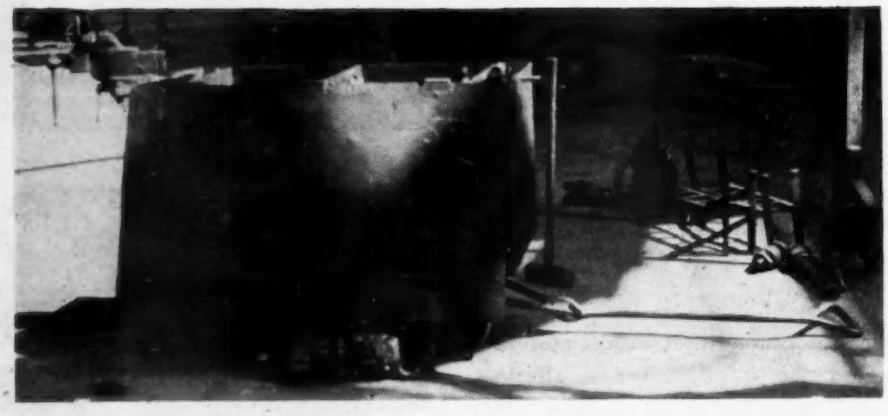
Portable Work Table Reduces Parts Handling

A portable work table which not only mounts a vise and provides for occasional mounting of an electric grinder will save much transportation of heavy equipment when overhauling station units. One such table is made up of relatively heavy tank steel, welded to form a rectangular box or bin, below which are mounted a pair of axles carrying wide-tread steel wheels, one axle being pivoted to simplify maneuvering of the table.

MOVABLE BENCH

The working surface of the table is hinged along one side of the box, and may be opened to give access to the storage space within the bin, or laid level when a working surface is required. The vise bracket is welded at the end of the table opposite the pivoted axle, and so positioned as to overhang the end and provide clearance for the cover to swing open without fouling the screw of the vise.

The same bracket serves for mounting of the electric drill when that unit is to be used as fixed grinder drive.



Mounted on sturdy axles with wide tread wheels, this all-steel box is provided with heavy plate cover which, when closed, serves as bench for heavy parts assemblies.

C. S. FOREMAN COMPANY

General Contractors

PIPE LINES

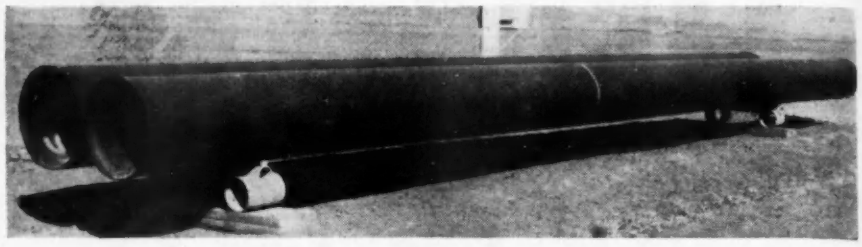
20 West Ninth Street
Kansas City, Missouri

Corrosion Prevention For Replacement Joints

Repair and emergency replacement joints of pipe are usually strung out at convenient intervals along a pipe line, with the joints supported on stands to keep them clear of contact with the ground, and above surface waters.

PIPE STORAGE

When the support is a timber or other flat surface, there is a tendency for water to gather at the contact, setting up rust conditions which may seriously impair the strength of the pipe at this point, long before it actually enters service in the line.



Elimination of wide contact occurring when timber supports are used for repair joints of pipe is attained by bar or rod cradles which insure adequate drying of point of contact.

One gas company reduces the usual area of contact to little more than a point bearing by superimposing above the usual timber foundation a rack made up by welding a short sucker rod bar or heavy small diameter pipe across two scrap pipe nipples, with bosses or cross members of rod attached to prevent the pipe rolling off the supports. Pipe stored on these bars affords only the contact of two oppositely curved surfaces for water collection, and thus tends to dry off quickly, the curved bar acting to conduct the drip away before rusting has set in.

The support is high enough to insure easy attachment of the truck sling or winch line when a joint must be transported, and although not attached to the timber base, is secured against possible molestation by the weight of the pipe stored on it.

Trapping of Vented Oil Prevents Fire Hazard

Handling of the fluid vented from a pump while clearing it of air or gas is simplified if it be run to a sump from which it can readily be picked up, but in which it does not form a fire hazard while in temporary storage.

PUMP VENTING

By venting from the end of the discharge line through a quarter-inch pipe which also serves as sampler when fluid is required, and carrying the flow beyond the control valve through a swing which normally aligns with a pipe tapped into a nearby drum as storage, the waste fluid, drip and amount beyond the valve are all trapped and collected. The collector line is brought into the bottom of the drum, to prevent gas wastage from collected fluids.

By carrying a suction line down through the top of the drum to within

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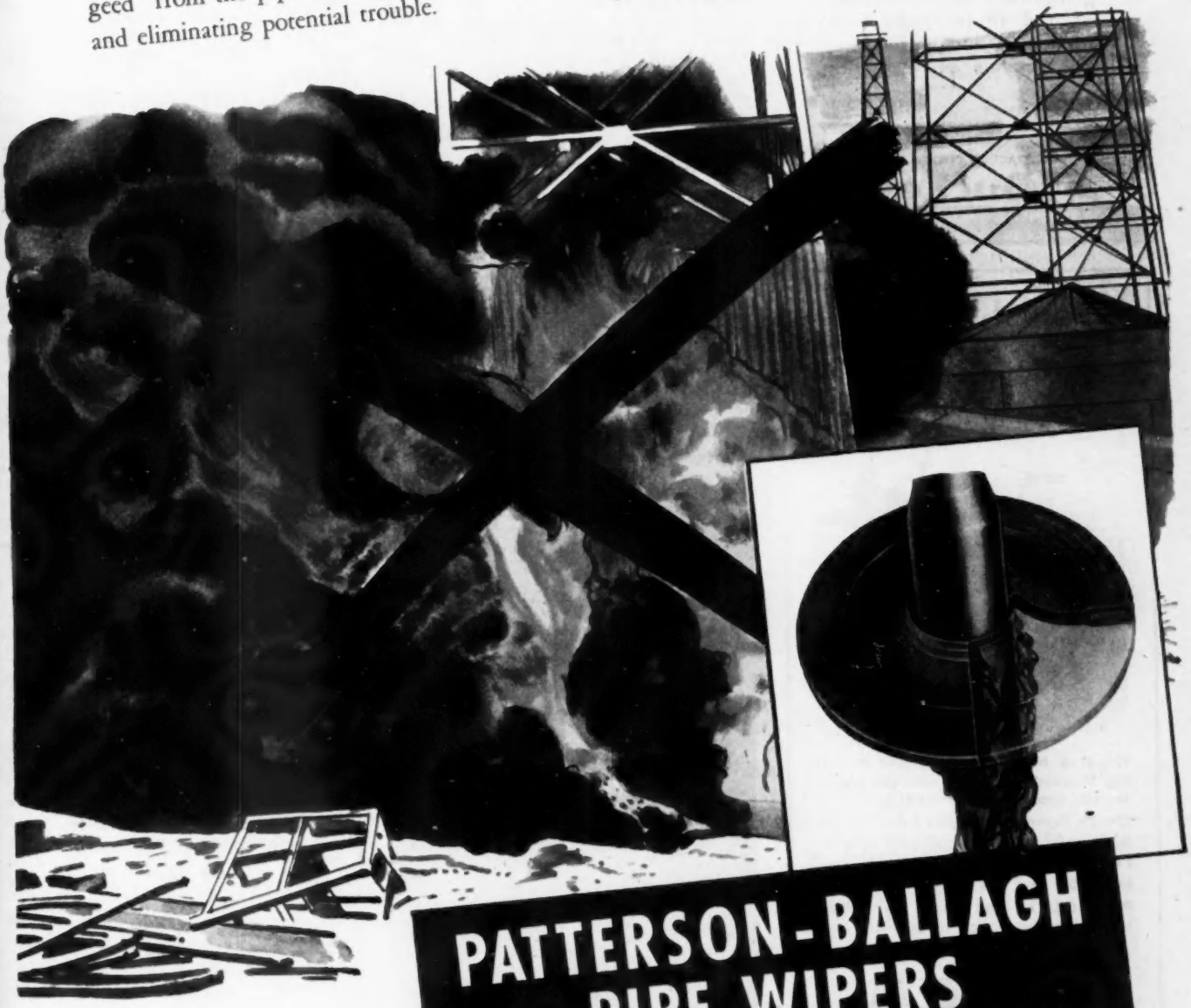

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SPEED: Complete cut and bevel can be made on 12 inch pipe in about 2 minutes.

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Write for Literature

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Buried drum serves as sump into which surplus from vent and sampling line may be diverted through use of swing line beyond valve used to control flow from pump discharge line.

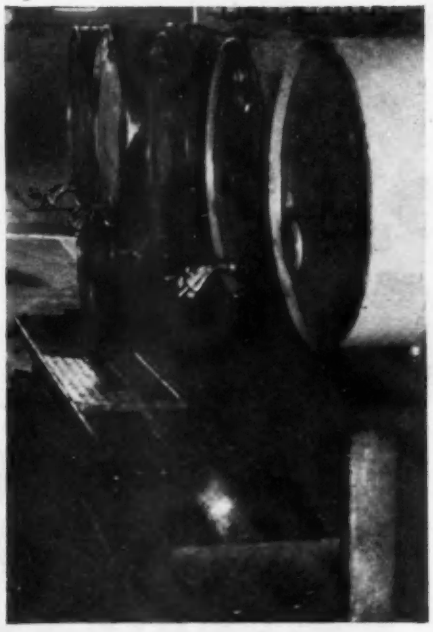
Rack Overflow Sump Salvages Lubricants

OIL RACKS

To salvage any oil which may be spilled or drip from the spigots of the storage drums, and also to keep the bottom of the transfer containers as clean as possible, one company places a drain below the drums at the station oil warehouse rack, the drain unit being made from a section cut from salvaged "Big-Inch" pipe, with light heads welded into the half round tank to form a catch basin. With feet of short pipe nipples or formed from light plate cut to conform to curve of pipe, this unit may be supported below spigot line-up, and serves as stand for bringing transfer vessels close to control valve, eliminating waste through spray and reducing time oil is exposed to air.

Such a member, fitted with light racks of expanded metal or perforated floor plate, serves as firm footing for the cans while being refilled, and also permits drainage to the sump below of any loss. The sump may be provided with tap and drain, if set high enough to allow catching of the oil thus drained off. Or, as is more frequently the case when the supporting grilles are tack welded within the vat, the entire unit is lifted at one end, or tilted to pour off oil accumulations, in which case the forming of a pouring lip in the end plate will help in reclaiming the waste oil.

By using a vat or basin large enough to extend the length of the drum rack, capacity is provided sufficient to trap the contents of a drum in case of damage to the spigot or bung threads, even should the leak go undetected for a considerable time.



Catch basin fitted below rack on which lubricant drums are stored traps overflow and spigot drip.

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Plug-Back Work With Plastics Shows Rapid Development

Setting time of plastics can now be controlled over a wide range of temperatures, which together with improvements in technique and tools have greatly expanded their application

By E. B. MILLER, JR., Tide-Water Associated Oil Company, Kilgore, Texas*

RECENT improvements and changes in the physical properties of plastics justifies a review of the material. Plastics have been developed that can be controlled in temperatures ranging from 80 degrees Fahrenheit to 280 degrees Fahrenheit. The setting time can be controlled by the use of varying amounts of catalyst. The viscosity of plastic is greatly influenced by temperature and changes from liquid stage to the solid stage by a slow gradual thickening. At 82 degree Fahrenheit the high temperature plastic has a viscosity of 850 centipoises and the medium temperature plastic 188 centipoises as compared with 285 centipoises for S.A.E. No. 40 motor oil. The specific gravity of the high temperature plastic is 1.18 (9.82 pounds per gallon) and the medium 1.2 (9.99 pounds per gallon).

The tensil of 240 pounds per square inch and compressive strength of 1900 pounds per square inch are comparable to neat cement. The solid plastic is chemically inert and insoluable in crude oil, brine, fresh ater and other materials commonly found in oil wells.

The amount of work being done with this material in the East Texas field and outside areas is given in Table 1. This table is a recapitulation bringing up to May 1, 1944, data which has been published previously. It shows a continued increase in the number of jobs being performed, a total of 679 jobs having been completed in East Texas field and 80 jobs in other areas. During the first 4 months of 1944, there have been 334 jobs completed as compared to 425 jobs in the entire year of 1943.

Table 2 shows the percent of successful water shutoff with plastics in the East Texas field. It includes all wells on which information is available up to April 1, 1944. Of the 539 jobs on which data were available, 64.9 were completely successful; 10.8 percent were partly successful in shutting off water, and 24.3 percent were not successful. The job was considered successful where all water was shut-off, partly successful where water percentage was reduced 50 percent or more, and unsuccessful where not reduced as much as 50 percent.

An increasing number of wells are being plugged back with plastics through liners or perforated casing, and the percent successful for this type job is higher than for all the jobs listed in Table 2. This is probably accounted for by the fact that better well information was available through gamma ray logs or electrical logs made prior to setting casing through the sand. Of the 75 wells listed in Table 3, 55 jobs were in liners and 20 jobs in perforated casing.

Plastic Is Adaptable

Plastic has several natural qualities which make it especially adaptable to plug-back work. Since it is a true liquid it can be forced into the formation at much lower pressures than can suspended solids. Experience has shown that plastic can be injected at pressures slightly higher than required by salt water. The excellent bonding quality of plastic to steel makes it an effective plug in liners or casing. In laboratory test pressures of 6,000 pounds have been applied to plastic plugs in casing without causing leaks or rupturing the plug. The length of time which is required for plastic to make the transition from a liquid to a solid state depends on the temperature of the well and can be predetermined by type and quantity of catalyst added to the plastic before it is placed in the well. This feature makes it possible to allow sufficient time to accomplish a desired amount of work with a reasonable safety factor.

In any type of plug-back job it is desirable to have a clean surface exposed through which the plastic may penetrate and set up. Not only will mud or filter cake prevent the intrusion of the plastic into the formation but laboratory tests have shown that mud greatly retards its setting time and results in the formation of small unconsolidated round globulars of set plastic. Care must be exercised in using acid for a cleansing agent since it might cause a flash setting of the plastic.

Plastic will set up in an oil or gas bearing sand the same as in water sand, therefore, in most cases it probably would be desirable to keep the plastic below the anticipated producing zone. In cases where plastic has covered this zone permeability has been re-established by drilling out and gun perforating. Results of experiments with similated bottom hole conditions using 4-inch standard gun are as follows:

Substance	Inches Penetration
Plastic	8½
⅜-inch steel and plastic	6⅜
Plastic and sand mixture	8¾
⅜-inch steel, plastic and sand	9

Drilling time of the plastic is comparable with cement and will usually range from 1 minute per foot to 5 minutes per foot with a rotary and a chisel nosed hydrostatic bailer will re-

TABLE 1

Total Number of Plastic Plug-back Jobs By Months

	East Texas	Outside	Total
1943			
January	1	..	1
February	1	..	1
March	5	..	5
April	8	1	9
May	13	6	19
June	23	6	29
July	29	4	33
August	41	3	44
September	43	7	50
October	53	11	64
November	58	14	72
December	87	5	92
1944			
January	28	4	32
February	116	4	120
March	64	6	70
April	109	9	118
Total	679	80	759

TABLE 2

Analysis of Plastic Plug-Back Jobs in East Texas Field

LOCATION	No. Jobs	Completely Successful	Percent	Partially Successful	Percent	Not Successful	Percent
East Texas	539	350	64.9	58	10.8	131	24.3

TABLE 3

Plug-Back Jobs Through Liners or Perforated Casing

Total Wells	Completely Successful	Percent	Partially Successful	Percent	Not Successful	Percent	Wells Not Reported On
75	55	73	8	11	12	16	2

*This paper presented before meeting of Southwestern District of American Petroleum Institute's Division of Production in Houston, June 13-14, 1944, under title of "Plug Back Work With Plastics."

Moore MASTS

Since steel was first used in the manufacture of drilling derricks, Lee C. Moore engineers have concentrated their efforts on the fabrication of drilling structures for the petroleum industry.

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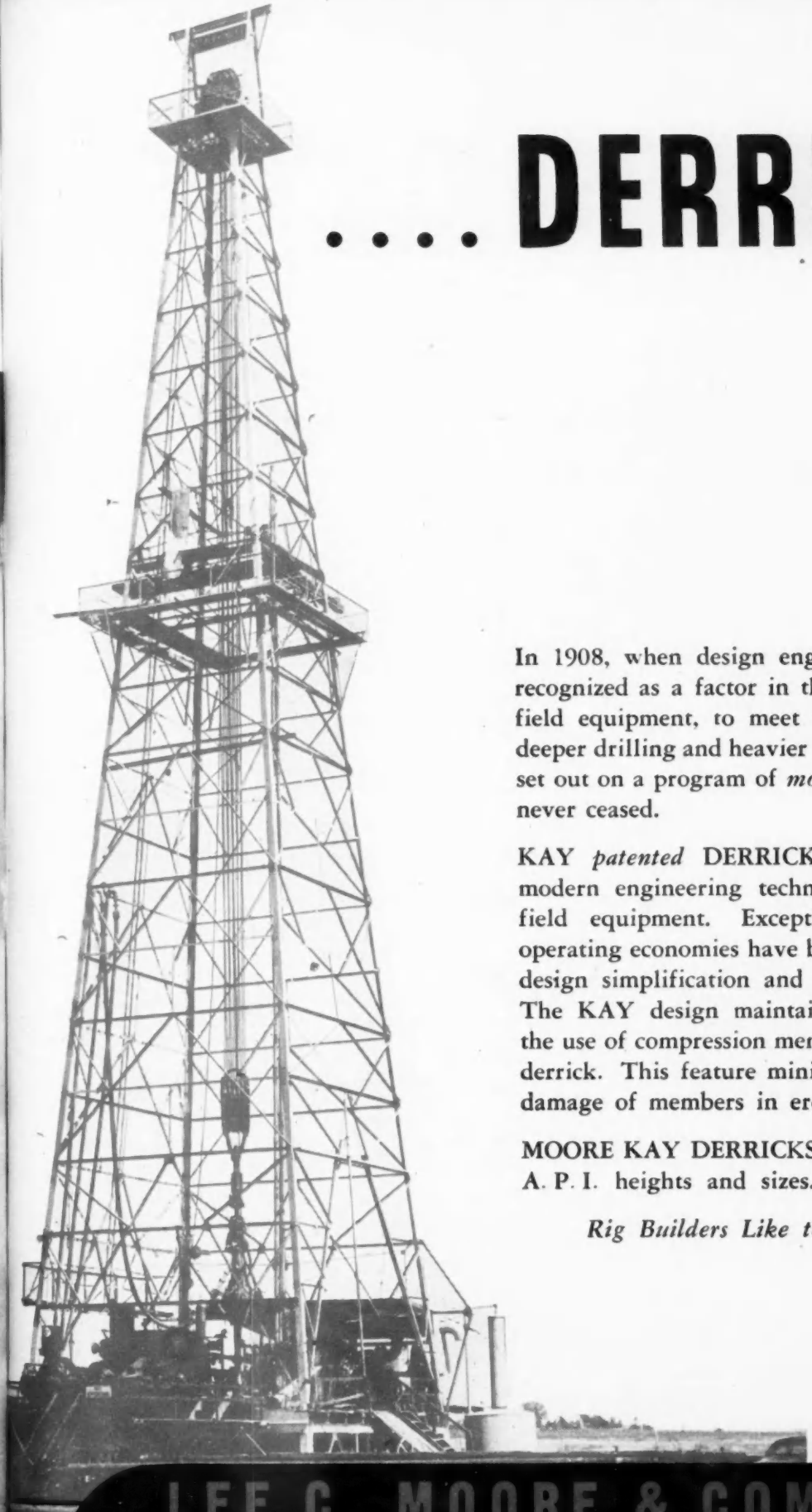

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move it at a rate of about one foot per hour.

The dump bailer method of using plastic has been discussed in previous reports[1,2], however, there have been at least two new developments which have become rather widely used. Where long sections or large diameter holes are to be plugged back, gravel may be used either as a filler or a bridge. The most common practice in the East Texas field is to use the gravel as a filler, thereby reducing the amount of plastic needed and reducing the cost. The procedure is to dump the desired amount of plastic on bottom then using an especially designed gravel bailer dump ¼-inch pea gravel in the plastic. With no loss into the formation 3 gallons should fill the voids in 10 gallons of gravel. The top of this plug is measured and the procedure repeated if necessary. If only a few feet of hole remains to be plugged a solid plastic plug is used to top out with. Where the sands are very permeable and considerable amounts of plastic may go back into the formation flaked cellophane can be used to reduce the permeability of the formation and prevent excessive losses of plastic. From ¼ to 1 pound of flaked cellophane per 10 gallons of plastic are used depending on the permeability of the formation and the viscosity of the plastic.

When gravel is used as a bridge it is placed on bottom with the gravel bailer in successive dumps until it is brought up to the desired height. Plastic mixed with flaked cellophane is then placed on top to form an impervious cap. After this cap has hardened sufficiently to support the plastic bailer additional plastic is placed as in a conventional plug back.

Plug Back Through Liners or Perforated Casing

The trend in the East Texas field has been to do an increasing number of plug-back jobs through liners or perforated casing. To date 75 wells have been plugged back in this manner and a study of the results indicates that it is just as successful as plugging back in open hole. (Table No. 3). It is essential that the mud and filter cake be removed from behind the liner in order that the plastic may have a clean surface to penetrate and set against. There are several methods used to accomplish this, such as washing through the inverted swab, reverse circulation, acidizing the liner or using hydrostic bailer. The most successful results have been accomplished by using the hydrostic bailer. After the liner has been cleaned, a gamma ray survey should be run to give the operator accurate information on the top of the sand, casing seat, and top of the liner. With this information and a clean formation behind the liner, it is believed that just as much success can be expected as in plugging back in the open hole.

Gravel Dumping Bailer: The bailer used for dumping gravel is an especially designed tool which is run in the well on a ⅜-inch line in the same manner as the plastic dumping bailer. Included in the bailer is a set of regular 4-inch bailer jars connected to a ⅝-inch rod which runs the entire length of the bailer. A plastic or a thin metal disc closes the bottom of the bailer and is broken when set on bottom by the ⅝-inch rod under the weight of the jars. This ⅝-inch rod works freely inside a ¾-inch pipe, and this action breaks up any gravel bridging and insures that all gravel is dumped. Bailers are built in size ranging from 3 inches to 5 inches in diameter, approximately 22 feet long, and the 4-inch bailer will hold 10 gallons of gravel.

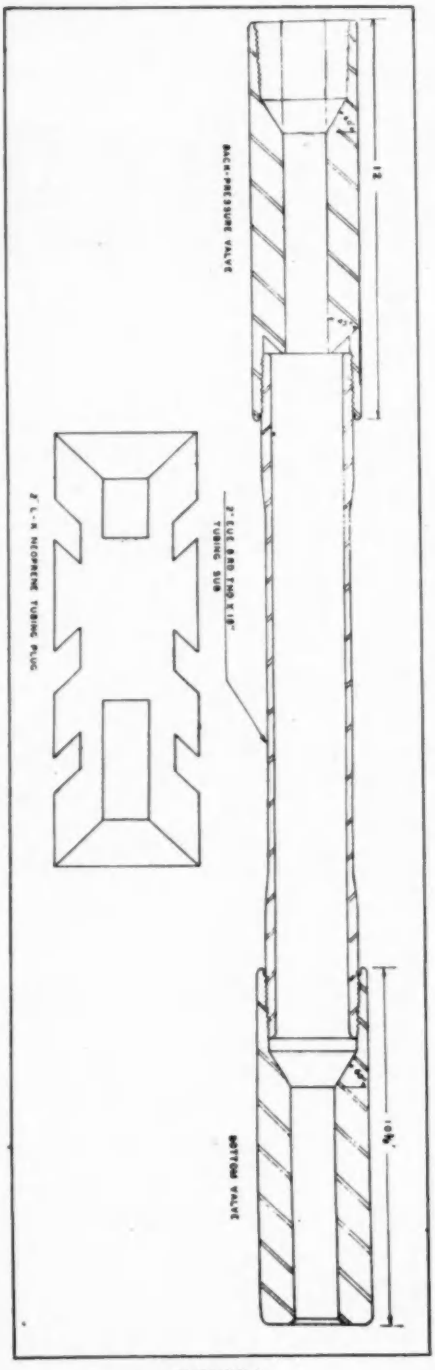

FIGURE 1
Tubing Plug Landing Tool

Plastic Squeeze: A recent development has made it possible to use plastics for squeeze jobs in much the same manner that cement squeeze jobs are performed. The tool used consists of 2 choke nipples spaced about two feet apart on the bottom of the string of tubing. On 2-inch tubing the inside diameter of the chokes is 1 3/16-inch with tapered throat and the top choke is so designed so as to serve as a back pressure valve, the bottom choke is plain end. A rubber plug approximately 6 inches long is placed in the tubing ahead of plastic and a second rubber plug placed on top of the plastic. (Figure 1). The desired amount of plastic is thus accurately measured and controlled throughout the operation by being confined between two rubber plugs, also, contamination of the plastic is prevented. As it requires additional pressure to force rubber plugs through the chokes at the bottom of the tubing a positive indication is apparent at the surface when the plastic reaches the bottom, and also when it has been displaced from tubing. This feature is important since it eliminates many chances for error when small amounts of material are to be placed by the surface measurements.

Another Method

Braden Head Squeeze Method: The casing and tubing can be full of any type fluid that will keep the well from flowing. If mud is in the hole, enough water or calcium chloride solution is pumped down through the tubing to displace the mud above the zone to be plugged. (Figure 2). A rubber plug is then inserted in the tubing and the desired amount of plastic placed on top, which is in turn followed by a second rubber plug. The first plug is pumped through both chokes and the plastic is spotted, starting at the bottom of the perforations in the casing. The second plug is pumped through the first choke but **not** through the second; this serves as a back-pressure valve to keep the heavier mud column from pushing the plastic back in the tubing. The tubing is then raised up out of the plastic and the second plug is kicked out. The rams are closed about the tubing and pressure applied, the displacement being measured at the surface from a calibrated tank. Pressure is maintained on the tubing for a desired length of time. One advantage of this type of operation is that an injection rate can be established by pumping clean water into the formation which serves as an indicator as to the amount of plastic that will be necessary and also as to the pressure required to pump plastic into the formation.

Retractable Retainer Method: By using a retractable retainer above the choke assembly, a squeeze job can be performed in much the same manner as retainer squeeze jobs are made with cement. The use of a sufficient tail pipe with the choke assembly on bottom below the retainer reduces the chances of the plastic getting into the slips or other working parts of the retainer. It is advantageous to have a tool that can be washed while circulating through the tubing; in order that any mud and filter cake can be removed from the formation, opposite which the plastic is to be placed. It is also necessary to have a mandrel with sufficient bore to permit the rubber plugs to pass through without being ruptured. In 2 inch tubing a mandrel with a 1¼-inch bore is sufficiently large to pass the rubber plugs. The plastic is spotted on bottom in the same manner as in the Braden head squeeze method and the tubing is then pulled up out of the plastic. The rubber plug serving as a back-pressure valve is then pumped out, the retainer is set, and pressure is applied; the displacement being measured at the top of the hole. When sufficient pressure has been obtained or the desired amount of plastic forced out, the tubing is closed

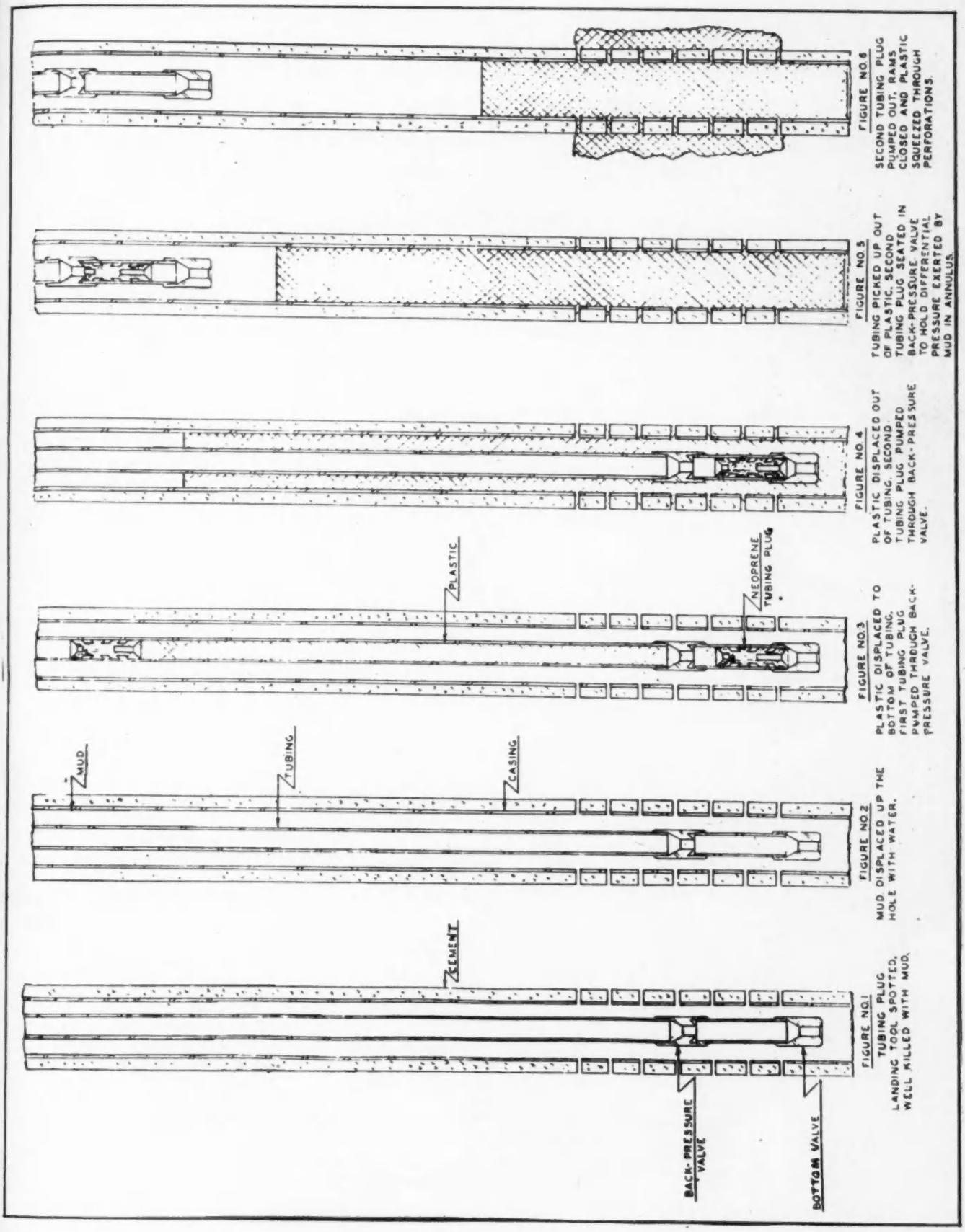
FIGURE NO.6
SECOND TUBING PLUG PUMPED OUT, RAMS CLOSED AND PLASTIC SQUEEZED THROUGH PERFORATIONS.
FIGURE NO.5
TUBING PICKED UP OUT OF PLASTIC. SECOND TUBING PLUG SEATED IN BACK-PRESSURE VALVE TO HOLD DIFFERENTIAL PRESSURE EXERTED BY MUD IN ANNULUS.
FIGURE NO.4
PLASTIC DISPLACED OUT OF TUBING. SECOND TUBING PLUG PUMPED THROUGH BACK-PRESSURE VALVE.
PLASTIC
NEOPRENE TUBING PLUG
FIGURE NO.3
PLASTIC DISPLACED TO BOTTOM OF TUBING. FIRST TUBING PLUG PUMPED THROUGH BACK-PRESSURE VALVE.
MUD
TUBING
CASING
FIGURE NO.2
MUD DISPLACED UP THE HOLE WITH WATER.
CEMENT
FIGURE NO.1
TUBING PLUG LANDING TOOL SPOTTED. WELL KILLED WITH MUD.
BACK-PRESSURE VALVE
BOTTOM VALVE

FIGURE 2
Showing plastic plugging service application through tubing.

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and the plastic allowed to set under pressure.

Drillable Retainer Method: When plugging back with plastic through a drillable retainer, the formation must be cleaned before the retainer is set. After this is accomplished the usual procedure is to run the drillable retainer with circulating jars above. Care should be exercised to use circulating jars which do not have by-passports in the nut on the top of the mandrel through which the fluid could circulate. Sufficient water should be placed on bottom to hold the mud above the perforations or formation and then the retainer set. Clean water should then be pumped into the formation to establish an injection rate and pressure. The next step is to pump the required amount of plastic into the tubing and place a rubber plug on top of the plastic. This is then pumped down and measured until the rubber plug passes through the circulating jars into the retainer. The back-pressure valve in the retainer prevents a back flow, and the rubber plug prevents flow down through the retainer. It is not desirable to use a drillable retainer on wells equipped with liners or screens, since it requires in the order of 14,000 pounds to 20,000 pounds pull to set this type of retainer and there is a possibility of pulling the liner or screen.

Looking Into the Future

As with any new product or development the conscientious production man and engineer immediately tries to make it applicable to his particular problems and it is through this method that most of our improvements in technique are accomplished and the scope of applications expanded. Given below are a few ideas which have come to the writer's attention, some of these are merely thoughts. The ideas follow:

(1) Selective plugging in lime fields for acidizing, using the electric pilot as a guide. (2) Selective plugging for gas-oil ratio control. (3) Shut off water sands in cable tool areas to eliminate extra string of pipe. (4) Tamp for nitro glycerine shots. (5) Sealing bridge plugs. (6) Sealing annulus between two casing strings to protect from corrosive waters. (7) Place plastic around shoe joint when cementing casing. (8) Setting blank liners. (9) Repair leaks in casing. (10) Selective control of injection zones.

Many of these applications may never be tried but it is safe to predict that the present field of application will be expanded many times as new areas and their local problems are encountered.

Acknowledgment

Special acknowledgment is made to Tide Water Associated Oil Company for permission to prepare and present this paper.

The assistance of Dowell Incorporated employes, who generously furnished data, is also gratefully acknowledged.

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Expansion Program for Mexican Oil Industry Is Outlined by Company

Petroleros Mexicanos, official oil company of the Mexican government, has started its program of rehabilitation and expansion of the country's oil industry which has been an objective for a number of years. The program is a broad one, calling for pipe lines, refineries, and tankers as well as rejuvenation of presently producing fields, and exploration. Arthur G. McKee & Company, engineers and contractors, have been retained for the whole program.

Pemex has announced intention to drill as many as 50 wildcat oil tests in Lower California alone, now has operations in the southern portion of the country, and has made location for Mision 1, as its first wildcat in the north. This test is in Tamaulipas, south of the Penitas Field in Hidalgo County, Texas.

Production is to be increased in the Poza Rica fields, nearly ruined by salt water encroachment 20 years ago, above its present 60,000 to 65,000 barrels daily by installation of equipment to demulsify and stabilize crude.

The pipe line from Poza Rica to Mexico City will be modernized to carry 35,000 barrels daily, and the old line from Tampico to Mexico City will also be reworked to transport 35,000 barrels daily.

A refinery at Atxcapotzalco will have an output of 1000 barrels of 100-octane aviation gasoline daily, most of which will go to the Mexico City airport. Mexico City will also use most of the 14,000 barrels of regular gasoline and 15,000 barrels of fuel oil produced daily.

Refinery, pipe line, and oil field work will cost at least $16,000,000, of which $10,000,000 is to be furnished by the United States Export-Import Bank.

Pemex has under consideration two cross-country pipe lines, one a 200-mile line to link Minatlan on the Gulf with Salina Cruz on the Pacific side. The other would run from Tampico to Mazatlan, a distance of 550 miles.

Contract has been given to Cia. Constructora Maritima, S. A. for 22 small, fast tankers for coastwise and Central America distribution.

United States firms would not accept Mexican contracts until Mexico made its peace with American oil companies last year, and it was not until Mexico made further assurances through diplomatic channels regarding treatment of foreign properties, that Washington would support the development program.

Hawkins Field Proration Order Attacked in Court

Humble Oil & Refining Company has filed suit in district court at Austin attacking the validity of the Texas Railroad Commission's proration order in the Hawkins field, Wood County, East Texas. The company contends that it owns 76 percent of the reserves in the field, but gets only 66 percent of the allowable.

Earlier last week a hearing had been called by the commission to consider the change proposed by this company. Other operators in the field protested that they were not ready, and Chairman Jester recessed the hearing to August 23, when it had been scheduled originally.

nally. Humble Oil & Refining Company objected to the delay. The company expects to rely on the decision in the McElroy (E. E. Marrs) case, which was decided in May.

Hearing on a temporary injunction has been scheduled for June 21.

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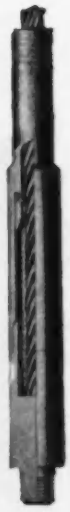

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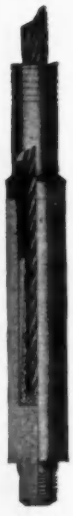

Solid Liner Type

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The special characteristic that does this job of keeping solids dispersed comes from the high detergency of Conoco HD oil. All this detergency, coupled with the excellent anti-oxidizing and anti-corrosive properties of Conoco HD oil, is made possible only by the combination of several special-purpose additives with the most suitable paraffin-base stock—solvent refined. Precise balance of all components is achieved.

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■ CONTINUED FROM PAGE 32

Many students agree that a proper budget would be about 9 billion dollars for state and local government and about 21 billion for federal government divided as follows: 6 billion for the military, 4 billion for civil expenditures, 2 billion for social security, and 9 billion for interest and repayment of the national debt. A program for taxes to meet this budget has been suggested as follows: 5 billion dollars from individual income taxes (about one third current collections), 5 billion from a 25 percent tax on corporate income, 1 billion from excise and inheritance taxes, 2 billion from social security taxes, and 9 billion from a one percent transactions tax. This should be ample since it calls for more than five times the budget before 1933.

Standardization in Compiling Data on Exploratory Drilling and Crude Reserves

By F. H. LAHEE, Chief Geologist
Sun Oil Company

During the past several years the need for more precise definition of terms used in connection with the statistics of wildcatting and crude oil reserves has become increasingly evident. With so much variation in interpretation of the terms "wildcat" and "semi-wildcat" considerable discrepancy has been noted in statistics compiled by different persons or organizations covering the same districts and the same dates, with resultant confusion in appraisal of exploratory effort, performances and forecast. Regarding crude oil reserves, widely divergent estimates made by different persons are thought to be the result of improper clarification and explanation of the basis used. In classifying exploratory drilling, an effort has been made to divide exploratory wells into 5 groups with definite conditions specified for each. Wells drilled on wholly undeveloped structures are termed *new-field wildcats. Outpost wells* are those drilled with a view of extending the limits of a partially developed pool. *New-pool wildcats* are those wells, drilled laterally outside the limits of a producing pool, but still on the same geologic structure with the object of opening a new pool or reservoir. *Deeper-pool tests* are those exploratory wells drilled for some unknown prospect below a developed pool. *Shallower-pool tests* are those drilled for some uncertain prospects above a developed pool. If wells are classified accordingly, any combination would be simple, whereas if they are not, no breakdown is possible from a statistical standpoint. In differentiating between "field" and "pool", a pool is any underground accumulation of petroleum in a single and separate natural reservoir characterized by a single pressure system so that production from any part would affect the whole, and effectively separated from other pools by geologic barriers. A field may be a single pool or it may consist of two or more pools, all on or related to the same geologic structure, which may be separated from each other by synclinal conditions, faulting, pinching-out, or changes in porosity and permeability. Various pools of a field may be at several horizons of different geologic age separated by impervious strata and may or may not overlap in a horizontal sense. The element of risk or failure is an important factor in classifying outposts and wildcats. A well may not be called a new-pool discovery unless it opens the first commercial production from that horizon, even though previous wells have established the existence of such a horizon, almost certain to produce. Although no definite classification system for estimating reserves has been submitted, it is urged that all those concerned with this problem state the category to which his figures apply in order to avoid confusion. Reserve figures may be placed in these groups:

Proved reserves—including drilled and undrilled.

Possible reserves—including discovered oil recoverable by more efficient production methods than those now in use, and undiscovered oil recoverable from pools above, below, and outside present developed pools on producing geologic structures, as well as oil presumed to be recoverable on local structures due to similarity of conditions to those prevailing in presently producing areas.

Hypothetical reserves — oil perhaps present in non-producing regions underlain by sedimentary formations producing in other regions.

Substitute reserves—oil which may be made available by chemical processing of natural gas, and oil available by distillation of oil shale, coal, and organic material.

Vocational Training for Petroleum Production

By ED. L. WILLIAMS, Director
Industrial Extension Service,
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The A. & M. College of Texas

Records show vocational courses operating in Texas in the early 1920's with refinery employe courses and foreman conferences, the period of greatest activity along these lines starting about 1932. At that time API officials met with educators from Texas, Kansas, and Oklahoma and outlined plans for an extensive training program starting with courses in oil field mathematics and science. Classes throughout the district attracted more than 6,000 oil field workers in a single year. Other courses followed among which were: advanced oil field mathematics, drilling practices, steam power, maintenance and repair of mechanical equipment, care and operation of internal combustion engines, pulling wells, and blueprint reading. An API committee is now preparing a new course for inexperienced oil field workers to inform them generally on systems of drilling and production. Foreman-improvement conferences were held for supervisors at which they were helped to analyze their jobs and solve their problems by collective discussion and thinking. These foremen are really the key men of the producing branch. With today's changing methods of production there are offered such courses as repressuring, recycling, and other secondary recovery methods, salt water disposal, and maintenance of bottom-hole pressures. The Texas State Board of Education has employed John Woodruff as full-time coordinator of petroleum industry training. There are now 400 men enrolled with another 150 on the waiting list delayed by shortage of technical men for instructors. Increase in manpower efficiency pays off much faster than raising plant efficiency.

Orderly Operation Sought For Nueces County Fields

Methods of allocation that will insure orderly operation of the 28 separate producing sands in the Agua Dulce and Stratton Fields, Nueces County, will be determined by the Texas Railroad Commission in orders to be issued as the result of a recent hearing.

Several sands in the field produce oil, others produce gas, and some of the gas sands contain an oil column in various sectors. At the hearing the commission sought information upon which to base an order that will prevent too rapid dissipation of the gas cap of oil sands, and that will assure pressure maintenance in the gas sands.

Because of lack of unity in the operations, the program may become seriously complicated. E. O. Bennett, appearing for gasoline-plant operators, recommended:

"In a gas cap reservoir containing an oil column, the gas cap operator shall have the right to withdraw gas in the same volumetric amount as total reservoir withdrawal of oil and gas by the oil operator. The relative acreage assigned to oil and gas wells to be given full consideration for determining such volumetric withdrawal.

"The gas-cap reservoir to have the right of withdrawal on the above basis where he has a legal market for the gas or where such withdrawal is necessary to protect his property from confiscation (where no oil column prevailing rules of the commission permitting a maximum of 25 percent of the potential would apply).

"The right of interchange of injection gas between operators.

"Not to be required to conduct injection of gas into sands without oil columns that are classified as non-cylable. Non-cylable sands are those considered physically unsuited, commercially uneconomical, or those from which equal or greater gas or condensate recovery can be made.

"The right to transfer gas from one sand to another where the net result will not cause confiscation of property or create waste.

"Require witnessed gas-oil ratio and formation-pressure tests on wells in gas-oil reservoirs.

"A tolerance in formation pressure of plus or minus 10 percent, such percentage as may be ordered by the commission of the pressure existing at the time cycling operations are commenced in gas sands without oil columns."

Talks Given on Testing Of Drill Pipes and Tubing

The Los Angeles Basin Chapter of API at its regular meeting June 13 heard discussions on "Various Methods of Testing Drill Pipe and Tubing," by Harry Whittaker of Dialoy Tubing Survey, E. T. Howes, of Magnatest Corporation, and R. A. Murdock, of Drill Pipe Testing Service.

JOSEPH A. KORNFELD, consulting engineer at Wichita, Kansas, for 7 years and more recently a metallographist for Hughes Tool Company, Houston, has joined The Texas Company as petroleum engineer in the Fort Worth division office.

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GARLOCK

BUY MORE WAR BONDS

Record-Breaking Runs to Stills Result in Adequate Production of Principal Products

Continued exceptionally good results in meeting heavy demand for petroleum products were recorded in the week ended June 10, as crude runs to stills were pushed to a new peak for the third successive week. Again the production of gasoline and distillate fuel oil expanded, with resultant beneficial effect on stocks, and although production of residual fuel oil was somewhat off, it was high enough to permit a substantial accumulation in storage.

The high runs exceeded domestic crude production by approximately 150,000 barrels daily, and since crude stocks have shown practically no change for more than a month, it is evident that crude requirements are being met in comparatively large part by sharply stepped up imports.

In setting the new record of 4,670,000 barrels daily, crude runs were 50,000 barrels a day higher than in the previous week and exceeded runs in the week ended June 12 last year by 876,000 barrels daily or 23.1 percent. Domestic crude production meanwhile averaged 4,523,000 barrels a day, the same as the record high output of the previous week and 536,000 daily or 13.4 percent above output in the corresponding week last year. Crude stocks totaled 234,476,000 barrels daily on June 3, having shown practically no net change for a month. They are about 10,000,000 barrels lower than a year ago.

Gasoline production was further increased by 77,000 barrels daily in the week ended June 10, having jumped above 2,000,000 barrels daily. The output of 2,031,000 barrels daily was 470,000 barrels per day or 30.1 percent greater than that reported in the like week last year. Stocks of gasoline were drawn upon subnormally, for this season, with production so high. Only 23,000 barrels daily came from storage, which totaled 86,911,000 barrels at end of the week, an amount 5,677,000 barrels or 7 percent larger than that of 81,234,000 barrels reported as of June 12 last year. Production data above indicate gasoline made from crude at refineries and natural gasoline blended at plants, and stocks are finished and unfinished.

Production of gasoil and distillate fuel oil averaged 714,000 barrels daily in the June 10 week, up 15,000 from the week before and 212,000 daily or 42.8 percent above output in the corresponding week last year. With the production so high and current use seasonally down, these light fuel oils accumulated in storage at the abnormal rate of 155,000 barrels daily, and at week's end totaled 33,669,000 barrels, up nearly 3,000,000 barrels or 9.4 percent from the 30,773,000 barrels reported as of June 12 last year.

Residual fuel oil production averaged 1,289,000 barrels daily, down 21,000 daily from the week before but 202,000 daily or 18.6 percent above production in the corresponding week last year. Stocks of residual accumulated during the week at the rate of 140,000 barrels daily, compared with decreases or only small increases in former weeks. The inventory of 51,221,000 barrels on June 10 was 16,000,000 barrels or 24 percent less than the 67,309,000 barrels held a year previously.

Trends of Operations and Changes in Stocks

Figures on crude stocks are from Bureau of Mines weekly reports; all others from American Petroleum Institute weekly reports, which are estimates on Bureau of Mines basis.
(All figures in thousands of barrels—add 000)

HIGHS AND LOWS OF RECENT YEARS

ITEM	Crude Oil Prod.		Runs to Stills		Crude Stocks		Gasoline Stocks		Gasoil and Distillate Stocks		Residual Fuel Oil Stocks	
	Barrels Daily	Week Ended	Barrels Daily	Week Ended	Barrels	Week Ended	Barrels	Week Ended	Barrels	Week Ended	Barrels	Week Ended
Highs:												
1941	4,337	11-22	4,120	10-18	266,187	3-29	99,727	3-29	[1]54,983	11-15	102,448	1- 4
1942	4,337	2- 7	3,961	1- 3	263,208	3-28	[1]109,281	3-14	49,861	11-14	95,857	1- 3
1943	4,436	11-13	4,331	12- 4	245,752	5-29	94,159	3-20	46,187	11-27	72,881	1- 2
1944	[1]4,523	6- 3	[1]4,670	6-10	240,992	1- 1	89,162	4- 1	42,310	1- 1	57,330	1- 1
Lows:												
1939	[2]1,601	8-26	3,125	2-18	[2]229,127	10-12	71,152	10- 7	20,722	4-15	105,397	4- 8
1941	3,364	1-11	3,490	1-18	240,399	11-15	79,923	10- 4	28,381	4-12	90,914	7-12
1942	3,297	7- 4	3,393	5-23	231,896	12-12	75,934	12- 5	29,240	4-25	72,962	12-26
1943	3,821	1- 9	3,579	3-13	232,191	1- 9	68,182	10-16	30,732	4- 3	57,596	12-25
1944	4,357	1- 1	4,228	2-12	233,632	4-29	76,302	1- 1	30,232	4-29	49,737	3-18

TRENDS OF 1943 AND 1944

Trends in Week Ended:	Crude Oil			Gasoline		Gasoil and Distillate		Residual Fuel	
	Production Daily	Runs to Stills Daily	Stocks Week End	Production Weekly	Stocks Week End	Production Weekly	Stocks Week End	Production Weekly	Stocks Week End
1943:									
January 2	3,871	3,734	233,938	10,957	82,420	4,285	42,913	7,683	72,881
January 30	3,826	3,698	233,863	10,339	88,830	3,888	37,057	7,452	70,763
February 27	3,873	3,709	235,217	10,566	93,157	4,230	32,939	7,839	70,140
March 27	3,896	3,742	239,126	10,231	94,079	3,541	30,980	8,018	67,938
April 24	3,913	3,737	242,035	10,583	91,001	3,954	31,142	8,168	67,455
May 29	3,970	3,679	245,752	10,656	83,937	3,798	32,274	7,672	67,682
June 26	3,955	4,015	242,657	11,092	79,589	3,876	34,044	8,126	67,960
July 31	4,133	3,788	238,420	11,127	74,977	3,765	36,363	8,478	66,877
August 28	4,196	4,227	236,170	12,420	72,525	4,351	37,928	8,732	67,250
September 25	3,344	4,156	233,013	12,206	70,024	4,608	40,328	8,560	66,659
October 30	4,383	4,176	237,219	12,813	69,297	4,642	44,591	7,968	63,833
November 27	4,414	4,261	239,761	12,638	69,980	4,379	46,187	8,633	62,143
December 25	4,363	4,185	241,310	12,597	74,024	4,457	43,791	8,689	57,596
1944:									
January 1	4,357	4,453	240,992	13,192	76,302	4,575	42,310	9,141	57,330
January 29	4,409	4,359	240,251	13,427	81,085	4,054	37,266	8,889	52,857
February 26	4,423	4,377	237,137	13,183	85,248	4,558	33,766	8,952	51,387
March 25	4,385	4,443	236,285	13,362	87,287	4,979	31,319	9,013	51,669
April 1	4,383	4,435	234,667	13,824	89,162	4,450	30,530	8,367	51,326
April 29	4,431	4,300	235,342	13,126	88,462	4,284	30,236	8,398	49,985
May 6	[1]4,519	4,316	234,166	13,115	88,267	4,118	30,438	8,946	49,841
May 13	4,502	4,400	234,706	13,618	87,823	4,545	30,763	8,399	49,737
May 20	4,513	4,483	234,299	13,536	87,962	4,675	31,088	8,415	49,977
May 27	4,514	4,532	234,423	13,502	86,468	4,702	32,035	8,568	49,812
June 3	[1]4,523	4,620	234,476	13,680	87,084	4,890	32,586	9,157	50,283
June 10, 1944	4,523	[1]4,670	.....	14,220	86,911	4,996	33,669	9,008	51,221
June 12, 1943	3,987	3,794	[4]245,107	10,934	81,234	3,498	30,773	7,597	67,309
Change:									
In week	.....	+50	+54	+540	—173	+106	+1,083	—149	+983
In year	+536	+876	—10,631	+3,286	+5,677	+1,498	+2,896	+1,411	—16,088
In year	+13.4%	+23.1%	—4.3%	+30.1%	+7.0%	+42.8%	+9.4%	+18.6%	—23.9%

[1] All time peak. [2] Lowest since April, 1922. [3] Lowest since October, 1922, due to shutdown of six Mid-Continent States. [4] Stocks, June 5, 1943.

Sun Oil Company Names Truex Division Manager

Arthur F. Truex, superintendent of the land and geological department at Tulsa for Sun Oil Company, has been promoted to general manager of the division, succeeding E. J. Gorman who will retire under the company's retirement plan. Guy E. Campbell, chief scout at Tulsa, will be Truex's assistant.

A. F. Truex

M. L. Brown, district superintendent of Sun Oil Company at Kilgore, Texas, has been named general superintendent of the Tulsa division, succeeding T. W. Parkin, who will retire, and H. C. Arnold, assistant cashier of the Tulsa division, has been promoted to cashier, succeeding E. C. Stewart, who will retire, Changes are effective July 1. Combined service of Gorman, Parkin and Stewart with the organization total 102 years. The retiring officials will continue to serve in an advisory capacity.

Kansas Hearing

Kansas State Corporation Commission has set June 23, as the date for considering market demands and to fix the state and pool allowables for July. Hearing is scheduled for 10:00 a.m. in Wichita.

U. S. Field Operations

Oklahoma

Wildcat Near Navy Field Being Closely Watched

Mid-Continent Petroleum Corporation's Westermier 1, NE SW SW 26-10n-3w, Cleveland County, 3 miles east of the nearest producer in the West Moore deep Wilcox pool, is reported feeling for the sand. The wildcat cut Pawhuska at 4181 feet, Hunton at 8030 feet and Viola at 8500 feet, and is making slow time below 8805 feet. A producer would prove the Navy's emergency airfield over which Congress is bickering as to whether or not to permit the Navy to return the land to the original owners for future oil development. Sunray Oil Company's Harden 1, NE SE NE 31-10n-3w, is coring in dolomite below 8893 feet and is nearing the pay. It cut Oswego lime 7530 feet, Hunton at 8060 feet and Viola at 8525 feet.

West Edmond: Muddy roads hampered operations last week while a shortage of heavy rigs leaves dozen locations spotted with little hope of early drilling. Anderson-Prichard Oil Corporation's Crookham Bros. 1, NE NE 17-13n-4w, extends the pool 1¼ miles south. Perforated and given 2000 gallons of acid between 6925-7040 feet in the Bois D'Arc section, it flowed 423 barrels of oil in the first 4 hours. It has been pinched back to 200 barrels per day, field allowable. Locations in Canadian County have been staked by Allied Oil Company. Locations for O'Brien 1, CSE SE 12-14n-5w, and O'Brien 2, CSW SE 12-14n-5w, on a trend of northern extension by Ohio Oil Company's producer in Section 7-14n-4w. Magnolia Petroleum Company's Lynch 1, CNW SW 4-13n-4w, in the south end of the pool, perforated at 6835-94 and 6904-21 and flowed 445 barrels in the first 3 hours.

Garvin County: Helmerich & Payne's Freeman 2, CSE SE 14-1n-1w, has been completed for 100 barrels of 39-gravity oil and 2,000,000 feet of gas per day, opening a new shallow pay in the Pennsylvanian section. The test was drilled between two Ohio Oil Company dry holes and picked up a sand at 1071-1119 feet. The discovery is on an Ohio Oil Company farmout and operators are back in Freeman 1, one of the dry holes in SE SE SE 14-1n-1w, where they ripped casing at 1270-71 feet and after getting a good show of oil and gas set retainer, squeezed and plan to perforate at 1235 feet. Delaney et al's Russell 1, SW SE SW 13-1n-1w, cored at 956-1001 feet and recovered shale and broken sand and is drilling slowly seeking the pay zone.

Beckham County: Northern Ordnance's Crawford 1, CNW SE 25-9n-22w, is preparing to drill below 6210 feet after a two-weeks fishing job.

Atoka County: Mid-Continent Petroleum Corporation staked location in SE SE 9-1s-12e, on a well recognized structure where Northern Ordnance is drilling Fulton Ranch 1, SE SW SW 19-1s-12e, a wildcat reported below 4224 feet.

Hughes County: Deep Rock Oil Corporation is running pipe in Hedley 1, NW NW SW 8-7n-10e, in the Horns Corner pool, after a drill-stem test in Cromwell sand at 3587-91 feet recovered 4 million feet of gas and considerable oil.

McClain County: Carter Oil Company, discoverer of the new Washington deep Wilcox pool, continues its attempt to extend the area with Lamar 1, CNE SW 28-8n-3w, north of Cole, drilling below 4423 feet in shale, and Johnson 1, CSW SE 30-8n-2w, west of Noble, making hole below 3700 feet in shale.

Pauls Valley: Operators in the Pauls Valley pool of Garvin County, Oklahoma, at a meeting June 13, at the Mid-Continent Oil & Gas Association office at Tulsa, voted to conduct bottom-hole and gas-oil ratio tests to determine the ideal gas-oil ratio at which the field should produce. The Oklahoma State Corporation Commission will supervise tests and later conduct hearing on results. Wells in the pool produce from the Pennsylvanian and Bromide zones from lenticular sands, some of which are producing at a gas-oil ratio of 3000/1. An ideal ratio in the field is said to be 650/1 and after tests operators will determine the best production methods to attain this ratio or as close to it as possible.

Kansas

Production Increased as Two Pool Openers Found

Two probable pool openers and a new pay discovery featured Kansas oil operations this week as the state added 5008 barrels of new oil to its daily production.

Barton County: Darby Petroleum Corporation's Kruckenberg 1, SE SE NW 13-19s-15w, set pipe at 3542 feet for a test in Lansing lime where good shows were found in cores at 3381-87 and 3395-3401 feet. Lansing was topped at 3227 feet. the wildcat is about 2¼ miles east of the Merten pool.

Graham County: Continental Oil Company's et al Trexler 5, NW NE 15-9s-21w, opened a new pay zone in Pennsylvanian in the Morel pool, when it was completed for 428 barrels of oil per day from 3682-98 feet. The Morel pool produces from the Arbuckle which was not present in the Trexler test.

Ness County: Skelly Oil Company is preparing to test Norton 1, NWC 23-17s-26w, 3½ miles northwest of the Aldrich pool. On drill-stem test in the Mississipian section between 4458-70 feet, the well recovered 25 feet of oil-cut mud after the tool had remained open 30 minutes.

Stafford County: The new St. John Townsite pool discovery appears to be

Wells Completed in the United States in Week Ended June 17, 1944

Data preliminary and subject to revision. Revised and more complete data on all completions shown in monthly summary of drilling, published in second issue of each month. More detailed data on wildcats published in third issue of each month.

State or District	FIELD COMPLETIONS: New Wells *Oil	Gas	†Input	Dry	Total	Old Wells Deepened	WILDCAT COMPLETIONS *Oil	Gas	Dry	Total	ALL COMPLETIONS: This Week	Last Week	Cumulative: This Year	Last Year
Alabama													12	1
Arizona													3	
Arkansas	1				1						1	4	87	121
California	36	1			37	1	2		7	9	47	38	931	610
Colorado	1				1						1		11	10
Georgia													1	2
Illinois	20			8	28				9	9	37	32	722	772
Indiana	1			2	3						3	4	120	119
Iowa													2	3
Kansas	14			6	20				7	7	27	41	754	735
Kentucky	6			5	11				2	2	13	11	297	131
Louisiana	8			6	14		2		1	3	17		321	273
North Louisiana	3			1	4		1			1	5		98	118
South Louisiana	5			5	10		1		1	2	12	6	223	155
Michigan	4	2		2	8				7	7	15		264	131
Mississippi													51	37
Missouri													9	9
Montana	7				7						7	9	138	90
Nebraska													7	23
New Mexico	5			2	7		1			1	8	9	192	118
New York	15		10		25						25	26	588	527
Ohio				1	1						1	9	330	385
Oklahoma	18	1	6	17	42		4	2	7	13	55	28	765	606
Pennsylvania	28	8	15	3	54						54	51	1,286	1,127
Tennessee													6	4
Texas	79		9	11	99	1	9		30	39	139	122	2,685	1,766
E.Tex.Bor. Co.'s							3			3	3		10	10
E. Texas Field													3	4
Rest of E. Texas	3			1	4				2	2	6	6	135	104
North Texas	15		9	1	25		2		11	13	38	21	629	402
W. Central Tex.	4			3	7		1		4	5	12	7	180	150
West Texas	29			1	30		1		6	7	37	28	724	406
Tex. Panhandle	5				5						5	7	104	97
G. Coast, Upper	9			2	11						11	12	241	130
G. Coast, Lower	12			1	13				2	2	15	25	413	268
Southwest Texas	1			2	3		2		5	7	10	10	201	164
S. Central Tex.	1				1	1					2	6	45	31
West Virginia	2	7		2	11						11	13	419	266
Wyoming	1				1						1	5	71	53
Total U.S.	246	19	40	65	370	2	18	2	70	90	462	408	10,072	7,919

* Includes distillate wells. † Includes salt water disposal wells.

an important strike as Stanolind Oil & Gas Company's Delker 1, SEc NE 33-23s-13w, which opened the new field, was given a state potential of 2358 barrels of oil and 5 percent water from Arbuckle which was topped at 3919 feet. Pipe was set at 3920 feet and the well was cleaned out and drilled to 3924 feet where on initial test it swabbed 28 barrels of oil for the first 2 hours from 325 feet off bottom.

Barber County: Phillips Petroleum Company's Marjorie 1, CNW SW 31-30s-13w, pool opener 2½ miles northwest of the Lake City field, is a completion in the Viola at 4511-19 feet. Perforated with 32 shots and given 2000 gallons of acid the well flowed 47,048,000 gas per day. Hole was drilled to 4775 feet and plugged back to 4580 feet.

Illinois

Clay County Wildcat Has Production Showing

National Associated Petroleum Company has an important wildcat showing for production midway between the Sailor Springs and Clay City pools of Clay County. It is Hunley 1, SE SW SW 8-3n-8e. On a one-hour drill stem test the well made 80 feet of oil and 45 feet of oil-cut mud. Casing was set at 3100 feet.

Wabash County: Central Pipe Line Company's Garst 1, NE NE SW 27-2s-13w, a discovery 3½ miles northwest of Enterprise, pumped 204 barrels of oil in 17 hours from McClosky lime, natural. Pay was recovered at 2713-21 feet.

Hamilton County: National Associated Petroleum Company's Hicks 1, SE NW NW 33-5s-7e, 1½ miles northeast of the Dale-Hoodville pool, swabbed 3½ barrels of oil per hour from McClosky lime at 3364-87 feet after 2000 gallons of acid. The well was slated for pump test.

Magnolia Petroleum Company has rigged standard tools to drill plug at Matheny 1, SW NE SW 19-5s-5e, a wildcat 7 miles west of McLeansboro. Casing was set to test a show of oil in McClosky lime at 3393 feet.

Clay County: Gulf Refining Company is still testing Pruitt 1, SW NW SW 15-2n-6e, a wildcat southwest of Flora after the well swabbed salt water and a slight show of oil during a six-hour period. Casing was perforated opposite McClosky lime at 3104-14 feet.

Jackson County: Magnolia Petroleum Company was rigging standard tools to drill plug at Froemling-Boescher 1, NW SE SW 11-7s-4w, wildcat northwest of Murphysboro. Casing is set at 3432 feet, total depth 3488 feet.

Douglas County: Ohio Oil Company has acquired 7000 acres of land in wildcat territory near the town of Tuscola for a proposed 6000-foot test. The Illinois State Geological Survey has taken an optimistic view of the well's chances.

Kentucky

Success of recent completions in the Uniontown pool in Union County makes it the most active pool in the state. Twenty-four wells are drilling in the area and 1 location has been made. The number of wells drilling tops pool activity in Indiana and Illinois also.

Best of the completions were Carter Oil Company's Watt Clements 5 and 4, 21-P-19. Clements 5 made 720 barrels of oil and no water during swab test after a 30-quart shot, while Clements 4 made 672 barrels of oil and no water. Pay depths are approximately 2260-80 feet in the Cypress sand. The pool also produces from the Waltersburg, Tar Springs and McClosky.

Indiana

Baldwin, Barrett and Meisner have a small producing well showing for a discovery 3 miles northeast of production in the Mt. Carmel pool of Indiana and Illinois. It is Steckler 1, SE NE NW 35-1n-12, Knox County. During early tests it swabbed 3 barrels of oil per hour from Biehl sand at 1407-19 feet. Well is still testing.

George Boyce's State of Indiana 1, NE 23-3s-14w, in Gibson County, is drilling below 2200 feet, less than half the scheduled depth of the well. This venture is located on Continental Oil Company acreage at the edge of the Wabash River and will be drilled by directional hole to a point below the river bed in search of Devonian lime.

California

Kern County Well May Mean Pool Discovery

A new field apparently has been opened on Antelope Plains, not far from the Williams field, Kern County, with completion as a pumper of Shell Oil Company's Hopkins Fee 57X-31, SW SW SE 31-27-20, but unsatisfactory

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production tests due to sand troubles have given little opportunity to evaluate the find. Although carried in scout reports as an extension of Williams, strong evidence that it is producing from a separate structure likely will determine its final classification as a discovery.

Wildcat failures of the week were numerous—probably a dozen including several not yet formally recorded—but none of the large number of deep tests was in the list. Footage of the seven reported abandoned aggregated only about 25,000 feet. Four new wildcat starts were announced, the only one to attract much interest being an attempt Standard Oil Company will make to extend northwestwards the Aliso Canyon field, Los Angeles County.

Kern County: Superior Oil Company's first offset to its recently completed Bellevue area discovery, after flowing 2000 barrels daily from 6528-6628 feet on formation test of Upper Stevens sand, is being drilled for a test of the Second Stevens, expected at 8000 feet.

The Rio Brave, West area test drilled to 10 236 feet by Richfield Oil Corporation in 20-29-25, yielded no favorable results on tests of lower showings. Casing has been set at 4690 feet for a test of Etchegoin gas showings above that point.

Tejon Ranch, Los Angeles County's most persistently wildcatted area, is slated for a resumption of exploration activity. New tests are contemplated by Reserve Oil & Gas Company, Maurice Metzenbaum Associates, Kern Line Oil Company and Richfield Oil Corporation.

Los Angeles County: Chatsworth Reservoir area, San Fernando Valley, again is to be tested, this time by Richfield Oil Corporation. Location will be in Topanga Canyon, not far from the reservoir, which first gave evidence the area is over an oil pool because of petroleum pollution of the water supply.

A second test of the Sunny Hills Ranch area, between East and West Coyote fields, where Barnsdall Oil Company recently made what appeared to be a new dome find, will be drilled by that company 930 feet south and 330 feet east of the discovery well.

San Mateo County: Oil prospects of the Half Moon Bay area which have been unsuccessfully explored several times once more are to be tested, Richfield Oil Corporation having announced the beginning of a campaign with location of a first wildcat, Souza 1, to be drilled on a site yet to be selected, but probably in the northwest quarter of 18-7-4.

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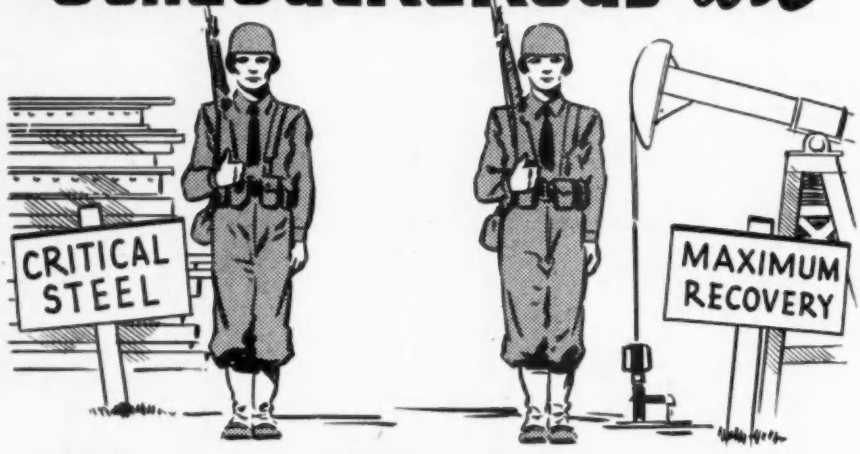

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New Mexico

Lea County Discovery Flows Oil by Heads

Lea County scored a new producing area when Fred Turner, Jr., et al's State 1-B, 2¼ miles west by south of the South Lovington field, flowed heads of oil with a small amount of water when agitated by swabbing. This discovery will make a commercial producer, and rig has been moved ½-mile north to drill Turner et al's State 1-C. Production is from broken saturation at 4887-5175 feet in San Andres, topped at 4670 feet with elevation of 3889 feet. No production test was made before landing 5½-inch at 4682 feet, as the favorable oil saturation and high structural position heralded a producer. It is 1⅜ miles southwest of a wildcat failure that yielded free oil from the same zone.

The Texas Company is starting operations on Fred Cole 2 as a south offset to its Baskin 1, Western Lea County discovery that flowed 254 barrels of oil, with gas-oil ratio of 885/1, on 21-hour natural test through open tubing. Production is from 3565-86 feet. Warren L. Todd and associates are the only lease owners within the discovery block, including 160 acres that will call for a southeast offset to the producer. A pipe line is convenient to the area.

Deep Tests: Humble Oil & Refining Company's Leonard-Federal 1 was drilling shaley-lime at 10,585 feet. Barney Cockburn et al's Wyatt 1, a mile southeast of Maljamar field, was idle for repairs at 6284 feet. DeKalb Agricultural Association's Stovall-Magnolia 1, 4½ miles east of the Monument field, was drilling at 6924 feet. Continental Oil Company et al's Skaggs 2-B-23, ¾-mile southeast of nearest Monument field production was drilling lime at 8581 feet with Ellenburger as its objective.

E. L. DeGOLYER and **LEWIS W. MacNAUGHTON,** Dallas consulting geologists and engineers, have been added to the board of directors of Republic Natural Gas Company, Dallas.

East Texas

Winnsboro Discovery Has Favorable Structural Position

Gulf Oil Corporation's Hornbuckle 1, situated 3000 feet north by west of the company's Winnsboro pool deep discovery, was drilling limey-shale at 7720 feet, and continues to improve its structural position. It is about 100 feet high on the first 2 anhydrite stringers. The discovery made a natural flowing well from Bacon sand in top of Rodessa at 7990-8014 feet after excluding temporarily an oil flow from Gloyd at 8253-88 feet. This is the most important discovery for the district this year, and the launching of an active development program rests upon the outcome of this confirmation well.

Deep Prospects: Barnsdall Oil Company's Heilborn 2, offsetting a smackover lime failure in Bowie County, entered Cotton Valley at 6270 feet, about 5 feet high, and was drilling at 6415 feet. In Van Zandt County, The Texas Company's Easley 1, Jackson area, logged the Massive Anhydrite-Rodessa contact at 7893 feet, and was coring dry sandy-lime and shale at 8060 feet. Humble Oil & Refining Company's Suratt 1, Edgewood prospect, entered Massine Anhydrite at 7495 feet, and was coring Rodessa shaley-lime at 7650 feet. In Wood County, Magnolia Petroleum Company's McGee 1, second try for the company on a southwest strike from the Coke field, was drilling at 5780 feet in Georgetown, topped at 5268 feet. J. G. Phillips and C. W. Killough's Oliver 1, Thelma area, Limestone County, logged broken anhydrite at 4480-4500 feet, and was nearing its 5200-foot depth contract after indicating salt water in a core at 5170-84 feet.

Quitman: Amerada Petroleum Corporation's Grice 1, H. Anderson Survey, assured a 1750-foot northeast extension in entering Paluxy oil sand at 6285 feet with elevation of 429 feet, and was coring pay at 6312 feet. It will be carried to 6324 feet, 10 feet above estimated water level, before running pipe to complete. This outpost entered pay 9 feet low to the nearest producer, which had 26 feet of solid sand. Shell Oil Company's Whatley 1, which has been of field, was drilling sandy-shale at 6200 feet. This outpost recorded favorable structural position in logging top of Georgetown at 5065 feet.

Manziel: Amerada Petroleum Corporation and Shell Oil Company's Hague 1, John Polk Survey, cemented 7⅝-inch pipe at 6400 feet to continue to the Lower Trinity. Barren Paluxy was entered at 6276 feet and first water at 6409 feet. Its failure to produce from Paluxy is attributed to a fault. Shell Oil Company's Whatley 1, which has been in process of completion as a discovery in the Rodessa, was pumping 27 barrels of pipe line oil daily from perforations at 8455-8505 feet. Shell Oil Company and Sun Oil Company's Herring-Scoggins 1 did not indicate production in the 8400-foot zone, and drill-stem in Pettit at 8720-39 feet yielded 120 feet of gas-cut rotary fluid with scum of oil. It will be carried to the Travis Peak.

Camp County: Six rigs are active in the Pittsburg 10-well field, giving the area its first competitive drilling. Gulf

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Refining Company provided the area with its first line outlet the past week. This eliminates tank truck charges borne by the operators since the completion of the discovery by Harry S. Moss et al in August, 1940. No dry holes have been drilled within, or near the field. Gulf Oil Corporation is underway on the first of 2 authorized directional holes scheduled for its Ferndale Club Lake leases that will be produced within the lake, but with rig spotted some distance from point of drainage and on dry land. The company's Ferndale 1 drilled verticle hole to 4111 feet in shale, then set whipstocks at 3344 feet and 4092 feet. Derrick is up for Ferndale 1-A, a 269-acre lease. New entrants into the field are the Cable Tool Drilling Company, Ryan Consolidated Petroleum Corporation, Magnolia Petroleum Company and Shell Oil Company.

Panola County: Arkansas-Louisiana Gas Company completed Pirkle 1, L. Shields survey, with a heavy, ungauged, flow of wet gas from Pettit, from 6002-28 feet, total depth 6600 feet. The well is 5 miles southwest of Carthage and 2 miles south of Feazel & Kinsey's Ross 1, Moorman survey, which was a recent 3-miles extension.

Roger Lacy's Cameron 1, LaGrone survey on the north flank of the field was dually completed, making gas-distillate from the 5800-foot zone in the Pettit, with estimated gas flow of 200 million feet, and at the 6400-foot level in the Travis Peak, with a gauge of 12 barrels of 44-gravity oil per hour. Both the Pirkle and the Cameron tests had been delayed for three weeks on account of flood waters.

Southport Petroleum Company's Scharnagel 1, Catherine Lindsey survey, in the Clayton area, 16 miles west of Carthage, developed water trouble in a test of the Travis Peak and a squeeze job is under way. The well made a good show in the Pettit. Total depth is 7,000 feet.

Intensified drilling activity in every section of the county is expected following successful completion of the two wells and the show made in the third wildcat.

Harrison County: Hassie Hunt is reported planning to deepen Bailey and Martin 1, J. J. Martin survey, temporarily abandoned at 6615 feet, after topping the Travis Peak at 6567 feet.

Cass County: Skelly Oil Company's Bemis 1, James Taylor survey, with an estimated flow of 700,000 feet of gas from 5954 feet, extended the Kildare field one mile north. At least half dozen wells in the field are closed in because of lack of pipe line for the gas. Gulf Refining Company has a line and gathering system for oil, but there is no gas carrier. Rogers Lacy was refused a permit by PAW for a 9-mile gas line to Jefferson, and afterward sold his holdings. Several operators now are said to be planning another attempt to get approval for a line.

North Texas

Northern Ordnance Plans Ellenburger Wildcat Tests

Northern Ordnance, Inc., is supplementing its aggressive drilling program in the Woodbine pool, eastern Cooke County, by starting 4 Ellenburger wildcat projects to 5000 feet or more elsewhere in the county. Three of the exploratory tests will be northeast, northwest and southwest of Gainesville, White Cox 1, Wm. Brunk survey, 2½ miles northeast of Burns City, will be on a geological strike to the south of its Woodbine strike.

Two pumpers were listed as completed for the company the past week in the Woodbine pool, giving it a trio of oil wells and two failures, while 3 outlying wildcats have been failures.

Denton County: Northern Ordnance's Donald 1, G. M. Dial survey and 3 miles east of Pilot Point, logged base of the Trinity series at 2010 feet with sand showing asphaltic oil saturation at 2040-50 feet, and was drilling at 2250 feet to explore the Ellenburger.

Archer County: Consoliated Oil Company and Premier Oil Refining Company's Garrett 1-B, John Walker survey, is opening the first deep production for the southeast portion of the county through having indicated a 100- to 150-barrel pumper from Strawn sand perforations at 3780-3800 feet. Small amount of oil was developed from Bend perforations at 4610-17 feet, but failed to qualify as a producer after acid treatment. The partnership is starting a second test on this lease.

West Texas

Gaines County Wildcat May Open Another Area

Continental Oil Company's Jones 1-A, northwestern Gaines County wildcat that tested water in Ellenburger at 11,845-12,222 feet, is showing some promise of opening the third Clear Fork oil area for the county. Clear Fork perforations at 7455-7591 feet returned 2000 feet of rotary fluid and oil on 12-hour drill-stem test and when flushed with 500 gallons of acid the well produced 9½ barrels of fluid averaging 10 percent oil and balance acid residue and rotary fluid on 7-hour swabbing test. The prospect was being swabbed down after treating with 4000 gallons of acid. It is 4 miles west by north of the Russell field.

Shell Oil Company's Jones 1, ¾-mile south by west extension for the Russell field and the third producer, flowed 140 barrels of oil on 10-hour test at 7780 feet after reacidizing lower section with 1500 gallons. It is showing for the largest producer although it is lowest structurally, having entered Clear Fork at 6025 feet or 126 feet low to the nearest producer. Oil produced in this field averages 34 gravity.

Buck 1, 1⅝ miles northwest of the Homann shallow gas discovery in Gaines County, proved dry on drill-stem test at 5350-5418 feet in San Andres and will be carried to the water level due near the 5490-foot level. It is 12 feet low to Honolulu Oil Corporation's shut-in gasser which showed a small volume of free oil in drilling San Andres to 5457 feet or 5 feet in the main water horizon.

Pecos County: Phillips Petroleum Company's Price 1, which established a new depth record in drilling to 15,270 feet or 9 feet short of previous measurement, has failed to respond to acid treatment through a series of perforations in Ellenburger topped at 15,075 feet. The well has prospect of making a producer near the 11,560-foot level.

Crockett County: Watchorn Oil & Gas Company's Thompson 1, ¾-mile north of shallow production in the Crockett County sector of the Yates field, was coring at 7463 feet in Ellenburger, topped at 7360 feet with elevation of 2165 feet, with no indications of production. The Yates field has been rated as an outstanding prospect for deep production, although Ellenburger failures have been recorded on the southwest and east flanks of the large structure. Thompson 1 entered Ellenburger 942 feet high to Standard Oil Company of Texas' Smith-Douglas 1, but is 771 feet low to Moore Exploration Company and Olson Oil Company's

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Halff 2-C, situated 3 miles to southeast. The Simpson zone was absent in the latter.

Amerada Petroleum Corporation et al's Todd 4-A, northeast edge of the Todd Deep field, Crockett County, was making production test of oil saturation at 6190-6270 feet in Ellenburger, topped at 6183 feet, having temporarily passed up production in the Crinoidal at 5814-5952 feet. The Ellenburger has been tested elsewhere on the structure with negative results.

The drilling of 12 to 15 proved and semi-proved locations in the Noelke field will result from the reduction of the well spacing rules by PAW from 40 to 20 acres. A. J. Rife and Floyd H. Scott have contracted for tests on their joint properties.

Terrell County: El Paso Natural Gas Company, which has heretofore confined its operations to New Mexico portion of the Permian Basin, has contracted to drill a 6500-foot Pennsylvania test near Section 216, Block Y, and 12 miles south of an abandoned deep gasser. The wildcat is on a block of about 65 sections, and it extends into Val Verde County.

Deep Tests: Sinclair Prairie Oil Company's Campbell 1, 8 miles south by west of the Keystone-Ellenburger field was coring dry dolomite at 12,181 feet in Ellenburger, topped at 12,045 feet. No shows have been encountered. The company's Grisham-Hunter 1, Andrews County, will perforate higher after testing dry from perforations at 10,012-10,037 feet and 9300-10 feet, having plugged back from granite at 11,322 feet. The Texas Company's Alexander 1, Pecos County wildcat, yielded 5580 feet of sulphur water when tester was used at 5751-5864 feet in Ellenburger, topped at 5585 feet. It will be abandoned unless decision is made to re-test nominal saturation passed up in the Upper Ordovician.

Col-Tex Refining Company's Miller 1, first Ordovician test for the Westbrook field, Mitchell County, had failed to indicate production in coring below 8035 feet, having entered Ellenburger at 7972 feet. Magnolia Petroleum Company's Butler 1, near the south line of Crane County, entered Ellenburger at 5954 feet, and was coring below 6030 feet without shows. Big Lake Oil Company's University 1-D, a mile west of Big Lake field production, recorded low structural position in topping Ellenburger at 9444 feet, and abondoned at 10,072 feet.

Andrews County: Stanolind Oil & Gas Company's Midland Farms 1-F, recent discovery and 6½ miles northeast of the North Cowden field, flows by heads at intervals after installing 2½-inch tubing, and likely will make its discovery allowable without using nitro or acid. Production is from San Andres at 4825-70 feet, having plugged back from water at 4939-42 feet to 4880 feet.

CHARLES ORR, secretary of the Interstate Oil Compact Commission, has resigned, effective June 30, to take over his duties as the secretary of the newly-organized Independent Natural Gas Association of America, with headquarters at Olkahoma City.

FRANK KING, Phillips Petroleum Company, has been elected vice president of the North Texas Scouts Association. His headquarters are at Wichita Falls.

Southwest Texas

New Production Opened In Agua Dulce Field

H. R. Smith & W. C. McBride's W. H. Rivers Estate 1, which opened new production 1½ miles northeast of southeast flank production at Agua Dulce Field, Nueces County, flowed 131 barrels of 40-gravity oil daily through a ⅛-inch choke on potential test, making 10 percent water. Tubing pressure was 850 and casing pressure 1500 pounds. Total depth of the well is 7419 feet with production from perforations at 7197-7205 feet. Rig has been moved to Rivers Estate 2, 2200 feet northwest and located in Section 302, Bishop subdivision. Two miles north of Banquette location is being made for L. M. Lockhart's Carrie Reeves 1, on a 1043-acre lease in the San Antonio de Agua Dulce and Casa Blanca grants.

Karnes County: Navarro Oil Company is making dual completion in Gauntt 1, Burnell area discovery which flowed from open hole in the lower sand at 6776½-84 feet, making 175 barrels of 34.8-gravity oil daily through a 3/16-choke under pressure of 1160 pounds with gas-oil ratio 850-1. No gauge is available yet from the upper sand where casing was perforated with 140 shots at 6648-53 feet, although it is flowing gas and condensate.

Stanolind Oil & Gas Company, Magnolia Petroleum Company, American Liberty Oil Company, and others have held a meeting to discuss preliminary plans for unitization of the Burnell area

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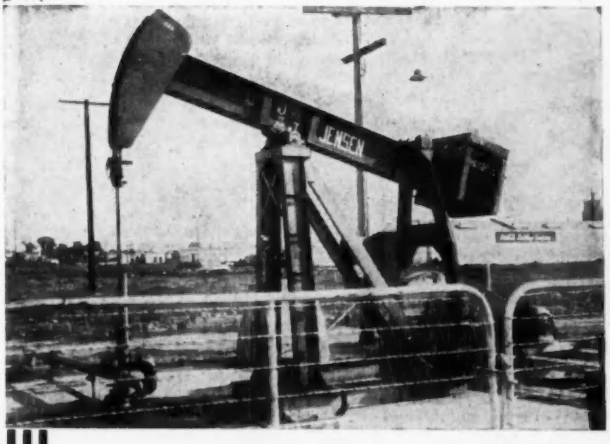

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Duval County: Harvey & Henderson's J. F. Welder Est. 1, discovery well 1¼ miles southeast of Eagle Hill Field is pumping 22.77 barrels daily from sand at 2069-76 feet, where casing had been set on top of pay.

Lavaca County: Sterling Oil & Refining Company has made location for Mary Hoffman 1, Wilcox test scheduled for 9000 feet, in the D. B. Oakes Survey 12 miles southeast of Yoakum. The well is on acreage farmed out by The Texas Company with Shell Oil Company, Phillips Petroleum Company, and Anderson Prichard supporting by contributions of either money or acreage. Cities Service Oil Company is also interested in the area.

Continental Oil Company has farmed out its 2500-acre Cistern block in western Fayette County to H. H. Coffield, who is to drill two wells to the shallow 1200-foot sand, and two more to the 2800-foot horizon, after which he is to become owner of production and equipment, with Continental reserving the rights below 2800 feet.

Texas Gulf Coast

New Oil Field Indicated For Colorado County

Shell Oil Company, Inc. has definitely indicated opening of a new oil field for Colorado County, producing from Wilcox sand. The company's Hill State Bank & Trust Company 1, 3½ miles southwest of Rock Island, is preparing for another test after squeezing off perforations at 9340-80 feet. It will probably test in the same horizon. On an earlier test in these perforations, the well flowed through a 19/64-inch choke making 58.2-gravity condensate at the rate of 208 barrels daily, along with 8 barrels of salt water and considerable gas. Total depth is 11,085 feet, plugged back to 10,624 feet.

Shell has also extended production in the Sheridan Field southwest with completion of Laura Lewis 1 from perforations at 9394-9406 feet. No gauge has been taken, since the well is still shut in for potential test, but at the time the well was cleaning, it flowed about 11 barrels of fluid per hour through a ⅜-inch choke part condensate and part wash water. Total depth of this well was 11,191 feet.

Superior Oil Company is preparing to drill a Wilcox test in Colorado County, a mile northwest of Altair in the Patrick O'Daugherty Survey on the Mrs. Matilda Tait land. It is scheduled to be carried to 13,500 feet.

Chambers County: Texas Gulf Producing Company and Tide Water Associated Oil Company are preparing to drill an outpost to the Jackson Pastures Field in southern Chambers County. The new test, G. C. Jackson 1, will be located in the J. S. Roberts Survey, A-21, 2640 feet northeast of Crosby, Kirby et al's J. E. Jackson 1, discovery gas-condensate discovery for the area.

Sun Oil Company has spudded W. L. Evans 1, southwest of the recent North Winnie discovery well, and has set conductor pipe at 82 feet. Sun has also made location for Rosa Arens 1, as a north outpost in the North Winnie Area, 1275 feet northwest of the P. E. Daugherty 1, discovery well.

Fort Bend County: Snake Creek Oil Company has made location for Edward Schroeder 1, a 7000-foot wildcat test 5 miles southwest of Beasley.

Matagorda County: Skelly Oil Company's Granbury Fullilove 1, wildcat, 3 miles northeast of Van Vleck is scheduled for 10,000 feet. Ohio Oil Company's Hefflefinger and Hermanson 1, wildcat northeast of Blessing, is waiting on cement after squeezing off the perforations at 8811-21 feet, and will make another test. It swabbed salt water with some gas and a scum of distillate.

San Jacinto County: Humble Oil & Refining Company's T. S. Foster Estate 1, in the Linda Saunders Survey 5½ miles northwest of Cold Springs is drilling in surface formations below 700 feet. Southeast of Shepherd, Stanolind Oil & Gas Company's Falvey 1, is drilling below 8385 feet in hard shale and sand after having been shut down on account of high water.

South Louisiana

New Field Likely for The College Point Area

Humble Oil & Refining Company may open a new field in the College Point Area of St. James Parish. Its Rosa Roussel Keller 1, Section 31-12s-4e, perforated casing at 10,758-768 feet with 40 shots early last week and ran tubing for a production test. On preliminary gauge it flowed through a 3/16-inch choke at the rate of 100 barrels of 43-gravity oil daily, but was later killed and squeezed for a test in a sand just above 10,300 feet where it will perforate about a 5-foot section. No report is available as to whether or not salt water had been in evidence during the test reported above.

Lafourche Parish: The Texas Company's LL&E Leeville 93, on the south flank of the Leeville Dome, LaFourche Parish, has opened a new deep pay zone, flowing oil from below 11,000 feet. With total depth 12,022 feet, 7-inch casing at 11,474 feet and perforated at 11,408-28 feet, the well was completed flowing 260 barrels of 32.5-gravity oil daily through a ⅛-inch choke with tubing pressure 1850 pounds, gas-oil ratio 760-1. With opening of this new pay, the Leeville Dome, on which production was first opened in May of 1931, now has production at levels all the way from 3600 feet to 11,400 feet. It has produced around 17,000,000 barrels of oil.

St. Landry Parish: Danciger Oil & Refining Company has now made location for Pothier 1, to enter operations in the recently-opened Cankton Field in which Sun Oil Company has been the only active operator. Danciger's well is located in the southeast corner of Section 12-8s-3e, and is a northwest outpost to the discovery and only producer. Sun Oil Company now is nearing discovery depth in Laurent Patin 1, southwest offset to the Boagni 1-B producer, and has made locations for Boagni 2-B, west of production and Domengeaux 1, southwest of discovery and west of Patin 1.

Acadia Parish: Sun Oil Company's Freeland 1, 1½ miles northeast outpost in the Egan Field area, has resumed drilling below the 10,525 feet of 7-inch

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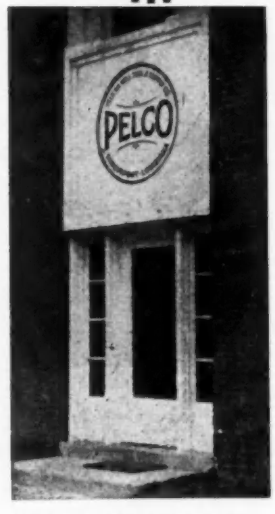

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casing, and is going ahead below 10,543 feet. The casing was probably set as protection casing before drilling into the level of the producing sand which was found just below 10,600 feet in the discovery well.

Iberville Parish: Humble Oil & Refining Company has made location for a new test in the Bayou des Glaise area where first commercial production recently was opened by Wilberts 4-B on the north flank. The new well is Wilberts Minerals Corporation 1-C, 1650 feet north and 33 feet east of the southwest corner of Section 77-8s-8e, 2000 feet east of the discovery.

Evangeline Parish: Gulf Refining Company's Schlicher-Thomas 8-A, Tract 1, is expected to open first production on the south flank of the Pine Prairie Dome, which now produces on the east, north, and west. The well was drilled to total depth of 10,669 feet and set a string of 6-inch casing on bottom.

North Louisiana

Paluxy Sand Producer Found in Caddo Parrish

North Louisiana last week saw completion of a Paluxy sand wildcat in Caddo Parish, the first producer in the parish from that zone, and 18 other exploratory tests drilling in various sections of the northern parishes.

Cotton Valley Operators Committee's Gray 1, 26-21-10, Webster Parish, is installing heavier equipment before attempting to complete at 10,651 feet. Gas pressure estimated at 8000 pounds was encountered at that level and the heavier equipment was indicated. Several other interesting shows were encountered below 9000 feet, deepest present production in the Cotton Valley field.

Placid Oil Company's Tremont 1, 14-9-2, LaSalle Parish, with hole bottomed at 12,000 feet, is testing between 4000-5000 feet. Hassie Hunt's Hal Slaughter 1, 9-19-5, Claiborne Parish, is preparing to perforate around 9354 feet.

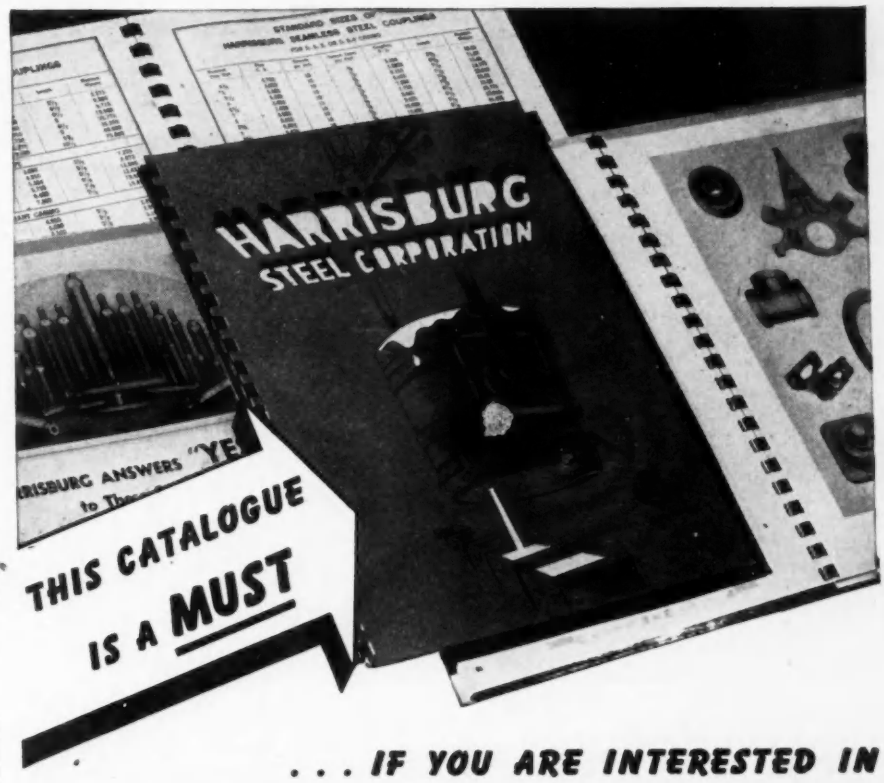
Gulf Refining Company and Houston Oil Company's Muslow 1, 31-20-7, deep test for lower stratas in the Lisbon field of Claiborne Parish, is drilling sand at 3766 feet.

Arkansas

Atlantic Completes Well In Old Mt. Holly Field

Completion of Atlantic Refining Company's Church 1 in the Mt. Holly field on the Columbia-Union County line, where there has been little drilling in recent years, as an oil producer, and location of 6 wildcat tests were the major factors of the week in Arkansas. Ouachita County got two of the new wildcats, Columbia, Calhoun, Little River and Pope Counties getting one each.

The Calhoun County test follows an extensive period of geophysical research in the county, which has only one producing well, 14 miles southwest of the new location. Apparent definite indications of the Irma-Troy fault zone north of the Smackover fault zone has stirred interest and a drilling campaign is expected along the trend.



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Mississippi

Gulf Gets Major Well In the Heidelberg Area

Gulf Refining Company's Morgan 1, SW SW 35-1-12, is in final stages of completion as a good oil well, extending the Heidelberg field of Jasper County two miles southwest. On an elevation of 418 feet, the well topped Wilcox at 1255 feet, Midway 3315 feet, chalk 3811 feet, and Eutaw at 4850 feet. Core between 4976-96 feet recovered 13 feet of sandy shale with showing of oil in the bottom 3 feet. In 18 minutes drill-stem test between 4936-96 feet, with ⅜-inch bottom-hole choke and 3/16-inch top choke, it recovered 18 feet oil and mud. Core between 4996-5036 feet showed good oil sand. Seven-inch casing was run to bottom at 5094 feet. Operators are divided on whether to class this well as an extension or whether it uncovers a new pool. All are agreed, however, that it is a major discovery and sure to add a renewed drilling program.

Rogers Lacy's Travis 1, in the Heidelberg townsite, is the first well in the area to go on pump, all others flowing.

Four new wildcats have been staked in the state and permits issued, one each in Clarke, Greene, Jones and Marion Counties. Exploro Corporation has taken out 4 permits for sulphur tests in Smith County.

Placid Oil Company's Crosby 1, Adams County wildcate, is drilling below 8600 feet.

Florida

Dade and Alachua County Each Gets New Location

Two new locations, one in Alachua and one in Dade County, and a renewal of leasing in many sections, with Barnsdall Oil Company entering the Florida play in Escambia County, marked the week in Florida. A new wildcat has spudded in Dade County and is drilling around 100 feet with cable tools.

Humble Oil & Refining Company's Gulf Coast Realty 2, 30-48-30, Collier County, after recovering saturated lime at 11-636-90 on drill-stem test, is coring at 12,194 feet in anhydrite formation.

In Dade County, W. G. Blanchard's Everglades 1, 31-53-35, is coring below 8900 feet.

Alabama

Considerable Activity Seen in Choctaw County

Hunt Oil Company, with 6 producers in the Choctaw field of Choctaw County, continues steady development of that area, keeping one string of tools busy.

Four active wildcats and one shut down, with one new location announced for Greene County during the week, keep lease play active. Stanolind Oil & Gas Company's Jack Woods, 23-14-15, Lamar County, had a gas show from the Pottsville, and is drilling ahead below 900 feet in hard sand. Humble Oil & Refining Company's Skinner 1 in Escambia County is below 1800 feet, and its Williams 1 in Washington County is below 7550 feet. The Texas Company is rigging Odom 1 in Washington County.

Georgia

Early County Wildcat Is Reported Testing

Warren & Robinson are testing A. C. Chandler 1, in the northeast third of lot 506, land district 26, Early County. Total depth is 7523 feet.

In Mitchell County, Stanolind Oil & Gas Company is drilling around 1000 feet in Pullen 1, lot 133, land district 10. Hunt Oil Company's Musgrove 1, land lot 98, Clinch County, is drilling below 4200 feet.

Michigan

Wildcat Starts Showing Big Increase for Year

Wildcat starts continue strong with 10 out of 20 permits last week bringing the year total to 112 compared to 77 at this date last year.

Sohio Petroleum Company's State A1, S½ SW SE 28-17n-12w, Lake County, had a good oil show and gas was logged 140 feet in Dundee at 3445 feet. The well was carrying water from upper formation. Casing will be re-set to test before drilling deeper.

Isabella County: Cities Service Oil Company's Methner B1, NW SE NW 33-16n-3w, South Wise field, swabbed 50 barrels net oil after 2000-gallon acid treatment in 4 hours but failed to flow. Pay is in Tuscola Monroe at 4424-46 feet, first well in county to offer prospect in this formation.

Wexford County: Hilliard & Fox's Larsen 1, N½ NW SW 24-22n-10w, Selma Township, was dry at 3892 feet after testing Dundee and Monroe. This well was drilled on strength of Dundee show in an old wildcat in Section 19-22n-9w, that carried Dundee pay at 3704-12 feet but never could be developed into a producer.

Rocky Mountain Area

Golden Eagle Structure Reports Discovery Well

Pioneer Oil Corporation had an important discovery in the Muddy sand at Unit 1, C NE SW 12-45n-97w, on the Golden Eagle structure, Hot Springs County, Wyoming, 20 miles northwest of Thermopolis. It drilled to 6776 feet, logged top of the Muddy sand at 6746 feet, and drill-stem test at 6746-6776 feet, open 10 minutes, yielded 15,000,000 cubic feet of gas, 2800 pound rock pressure, with 53-gravity distillate, estimated good for 600 barrels a day. A Frontier sand test, top of the first Frontier was reached at 5768 feet and on drill-stem test at 5768-5821 feet, open 33 minutes, showed 1,000,000 cubic feet of dry gas. All four Frontier sands carried gas. Golden Eagle gas field was abandoned in 1936.

Little Buffalo Basin: Stanolind Oil & Gas Company appears to have a good black-oil producer in Unit 2, NE NE NW 12-47n-100w, in the Little Buffalo Basin field in Park County, Wyoming. Top of the Tensleep was reached at 4463 feet, drilled to 4574 feet, and drill-stem test at 4300-4330 feet, open one hour, recovered 690 feet of mud-cut oil, and drill-stem test open two hours at 4463-4504 feet yielded 1890 feet of oil. Top of the Embar was logged at 4240 feet with top of Embar dolomite at 4295 feet. The Lower Embar section is being tested. Present well is located 2 miles north of the discovery and higher on the structure. The discovery well produced 140 barrels initially from the Tensleep sand at 4785 feet.

Southern Wyoming Wildcat: Oklahoma Oil Company's Union Pacific-Fuller 1, C NE NW 7-15n-75w, Tensleep test in the North Big Hollow district, Albany County, Wyoming, is moving in material. Objective of the test is estimated around 2500 feet and present well is an offset to a Muddy sand well which produced 15 barrels of oil daily from 920 feet.

White River Test: Frontier Refining Company's Government 1, NW NW 32-2n-96w, Western Colorado wildcat on the White River structure in Rio Blanco County, is perforating sand zones in the Mesa Verde formation between 5560-5968 feet, total depth 7003 feet. It had 1600 feet of oil in the hole and on swab test made 25 barrels a day.

Western Canada

North Turner Valley Is Extended Quarter of Mile

Two key extension wells in North Turner Valley, a quarter-mile north of the former north limits of production, have completed with initial flows that indicate two top ranking producers following acidization.

Home Oil Company and Anglo Canadian Oil's Home Millarville 16, lsd 9 18-21-3w5th, at 8746 feet, 412 feet in the Madison limestone, had an initial of 22 barrels hourly, and increased up to 51 barrels hourly after 2500 gallons of acid, split between the two porous zones. The two zones are being tested separately, after which further acid will be applied. British Dominion Oil and Home Oil's British Dominion 7, lsd 12 17-21-3w5th, had initial of 8 barrels hourly at 8629 feet, 479 feet in the Madison lime, and increased to 18 barrels hourly after a 2000-gallon acid treatment.

Pacific Oil & Refining Company's Twin River 2, lsd 13 2-2-20w4th, has been pumping 85 barrels daily of 32.6-gravity oil following two 500-gallon acid treatments, but operators believe output may increase to 150 barrels when a more satisfactory pump set-up has been devised. The well is the first commercial well in the Twin River area of Southwest Alberta.

Foothills Oil & Gas Company has staked location for a deep test of the Turner Valley East Side Limestone, opened during the past three years by a string of half a dozen deep wells, including Canada's deepest oil producer at 9612 feet. The new well, in semi-proven territory, is Foothills 20, to be drilled in the centre of lsd 14 4-21-3w-5th.

U. S. Exploratory Completions

CALIFORNIA WILDCATS

Kern County—Failures: E. A. Bender's Anderson-Potter 1, nw ne ne 19-29-21, Sheep Springs area, abnd 2072 ft.

H. H. Magee's Glide 5-11, se nw nw 11-27-28, Mt. Poso area, Vedder 1265 ft, abnd 1298 ft.

Texas Co.'s KCL Fruitvale 1, ne sw ne 26-29-27, Fruitvale area, some oil but wet on series prod tests, abnd 4514 ft.

Madera County — Failure: Texas Co.'s Moffatt 55-7, nw nw se 7-12-15, Firebaugh area gas test, Green sand 3990 ft, 1st Panoche sand 5678 ft, abnd 5694 ft.

San Joaquin County—Failure: Standard of Cal.'s Mandeville Island 1, gas test, Venice Island area, 5-2-4, McDonald area, abnd 5600 ft.

San Luis Obispo County—Failure: Los Nietos Co.'s Lowther 1, Oak Park Tr, 5-32-13, Arroyo Grande area, abnd 3421 ft.

Ventura County—Discovery: Delroy Pet. Corp.'s Lisk 3, se se se 22-5-18, Piru area, pump 2 bbls oil, 60 wtr, perf 2705-2750 ft, td 3149 ft.

Ventura County—Failure: Jeff J. Stevens' Boosey 1, ne sw sw 31-4-20, Santa Paula area, wet on prod test, abnd 1500 ft.

CALIFORNIA OUTPOST

Kern County—Extension: Shell's Hopkins Fee 57X-31, sw sw se 31-27-20 Antelope Plains area, pump 24 bbls oil, 12 wtr, perf 2485-2497, 2500-2515 ft, sand section 1850 ft, td 2917, pb 2520 ft.

ILLINOIS WILDCATS

Franklin County—Failure: Ring's Clayton 1, se se ne 2-5s-3e, abnd 3176 ft.

Hamilton County—Failure: Magnolia's Peoples Nat'l Bk 1, ne sw nw 27-3s-6e, abnd 3513 ft.

Jefferson County—Failures: Kingwood et al's Quick 1, nw ne 11-2s-3e, abnd 2974 ft.

Kingwood et al's Gilbert 1, se se sw 19-3s-3e, abnd 2925 ft.

Macoupin County—Failure: Fuller et al's Channess 1, ne sw ne 4-9n-6w, abnd 2253 ft.

Madison County—Failure: Bayer's Grimm 1, se ne sw 20-4n-6w, abnd 2478 ft.

Marion County—Failure: Shulman Bros. et al's Copple 1, se se se 13-4n-3e, abnd 2411 ft.

Wayne County—Failures: Texas Co.'s Desch 1, se se nw 15-2s-6e, abnd 3424 ft.

Venable's Koontz 1, sw se sw 29-2s-8e, abnd 3555 ft.

KANSAS WILDCATS

Barton County—Failures: Co-op Ref. Assoc.'s Beran 1, swc nw 24-17s-12w, Arb 3377 ft, Cong 3381 ft, abnd 3475 ft.

Cohen's Converse 1, nwc sw 17-19s-15w, Lans 3279 ft, Cong 3556 ft, Granite Wash 3640 ft, abnd 3649 ft.

Cowley County—Failure: Continental et al's Frye 1, se ne ne 23-31s-3e, Arb 3342 ft, abnd 3368 ft.

Ellsworth County—Failure: Skelly's Brown 1, sec 1-17s-9w, Arb 3282 ft, abnd 3312 ft.

Marion County—Failure: Texas Co.'s Weinbrenner 1, nw nw ne 34-19s-1e, Arb 3374 ft, abnd 3398 ft.

Rooks County—Failures: Vickers' Stull 1, nwc 10-6s-16w, Arb 4020 ft, abnd 4027 ft.

Barnsdall's Schlin 1, swc nw 9-9s-18w, Arb 3536 ft, abnd 3586 ft.

KENTUCKY WILDCATS

Hopkins County—Failure: Shaeffer's Baker et al 1, 19-J-25, abnd 2282 ft.

Ohio County—Failure: Carter's Wilson 1, 2-J-31, abnd 2242 ft.

NORTH LOUISIANA WILDCAT

Caddo Parish—Oil Discovery: Joe M. Burnham's Noel Estate 1, sw ne 11-19-16, perf 2465-2510, Paluxy, flow 20 bbls oil 76 bbls sw 8/64-in, td 3030 ft.

SOUTH LOUISIANA WILDCAT

Vermillion Parish—Failure: Phillips-Tide Water's Million 1, start nwc sect 90 go se alg nel for 5568.8 th sw at ra 1650 to lcn in 90-14s-3e, abnd 12,499 ft.

SOUTH LOUISIANA NEW PAY TEST

Lafourche Parish—Leeville Deep Discovery: Texas Co.'s LLE-Leeville 93, 5051 s 4700 w of nec se¼ sect 27-21s-22e, in sect 34, perf 11,408-28 ft, flow 260 bbls 32.5-gr, ⅛-in, td 12,022 ft.

MICHIGAN WILDCATS

Allegan County—Failure: C. A. Perry's Herp 1, se nw sw 9-4n-12w, Traverse, abnd 1695 ft.

Arenac County—Failure: Bert Baker's State A1, nw sw nw 2-19n-3e, Dundee 2905 ft, abnd 3070 ft.

Kent County—Failure: S. L. McCall's Bloomfield 1, sw sw nw 35-9n-11w, Traverse, abnd 2395 ft.

Mecosta County—Failure: Carter Oil Co.'s Flachs 1, sw ne se 9-14n-7w, Dundee 3736 ft, abnd 3740 ft.

Muskegon County—Failure: E. H. Strom's Nutt 1, ne nw se 16-9n-14w, Traverse, abnd 1961 ft.

Newaygo County—Failure: Rex Oil & Gas Co.'s James 1, sw sw sw 3-15n-12w, Traverse 2656 ft, Dundee 3179 ft, abnd 3365 ft.

Osceola County—Failure: Rex Oil & Gas Co.'s Keller 1, sw sw nw 30-17n-10w, abnd 3079 ft.

NEW MEXICO WILDCAT

Lea County—Discovery: Texas Co.'s W. H. Baskin 1, c se se 22-19s-33e, 5 mi ne Salt Lake field, nearest prod, elev 3632 ft, salt 1510-2990 ft, Yates frosted grains 3220-40 ft, solid lime 3420 ft, flow 254 bbls 21 hrs, natural via 2-in tubing, Seven Rivers (Capitan) 3565-86 ft.

OKLAHOMA WILDCATS

Canadian County—Failure: Gutowsky's Watson 1, se se sw 23-14n-5w, Hunton 7265 ft, abnd 7400 ft.

Carter County—Discovery: Samdan's Revelles 1, se se se 21-3s-2w, swab 27 bbls 1st 24 hrs, pump 240 bbls, td 5196 ft, pb 5130 ft, redr 5156 ft.

Kay County—Failure: West Virginia Oil & Gas Co.'s Johnson 1, ne ne 19-27n-1w, Arb 3594 ft, abnd 3896 ft.

Lincoln County—Failure: Sunray's Nelson 1, se nw se 21-13n-6e, Vi 4235 ft, 2nd Wx 4338 ft, abnd 4360 ft.

McClain County—Discovery: Carter's Cottingham 1, se sw 4-7n-3w, 2nd Wx 10,631 ft, perf 115, shots, 10,635-45 ft, flow 298 bbls 39.7-gr, td 11,208 ft.

Okmulgee County—Discovery: Greer's Henry 1, sw sw se 14-11n-12e, Le 2500 ft, flow 50,000 gas, td 3030 ft, pb 1530 ft.

Osage County—Failure: Peters et al's Osage 1, ne nw ne 7-22n-8e, Arb 2979 ft, abnd 3124 ft.

Coal County—Discovery: Phillips et al's payten 1, nw se ne 28-2n-9e, perf 5095 ft, flow 2,250,000 gas, td 5205 ft.

Okfuskee County—Failure: Donmar Oil Co.'s Curry 1, nw sw nw 25-13n-8e, 2nd Wx 4200 ft, abnd 4228 ft.

Oklahoma County—Discovery: Anderson-Prichard's Crockham 1, ne ne 17-13n-4w, perf 6924-7029 ft, flow 100 bbls hr, td 7039 ft.

Pawnee County—Discovery: Deep Rock's Callaway 1, ne nw ne 30-22n-7e, Arb 3158 ft, perf 5 shots 2530-35 ft, flow 240,000 gas, rp 765 lb si, td 3275 ft, pb 2542 ft.

Seminole County—Failure: Summit Drlg Co.'s Davis et al 1, ne nw se 17-8n-7e, Wx 4274 ft, abnd 4280 ft.

Stephens County—Failure: Clow et al's Battiest 1, sw sw ne 17-3s-4w, Arb 2350 ft, abnd 2435 ft.

EAST TEXAS WILDCATS

Van Zandt County—Failure: O. W. Killam et al's Giddens 1, 1230 ft ewl 2610 ft nsl of C. Beckett sur, ¾-mi s of Myrtle Springs, elev 538 ft, Pecan 2370-2624 ft, Austin 3349-3795 ft, Woodbine series 4295 ft, abnd 4375 ft.

Wood County—Failure: Allied Oil Co.'s Chrietzberg 1, 467 ft wel 933 ft snl of nw 50.3-ac tr, John Etheridge sur, mile se Quitman, elev 431 ft, Pecan 2946-3200 ft, Ector-Austin 4782-4966 ft, cut fault with 300-ft throw at 5128 ft, Woodbine 5165 ft, Buda 5808 ft, Goodland 7056 ft, Paluxy 7122 ft, abnd 7286 ft.

EAST TEXAS OUTPOST TEST

Limestone County—Barron: W. J. Gourley-Phillips' Barron, 660 ft out n cor 320-ac tr and SA&MG sur No 538, ¾-mi se Barron gas-distil prod, Austin 2540-2890 ft, Sub-Clarksville 2919 ft, Woodbine 3174 ft, Georgetown 3533 ft, Edwards 3880 ft, Paluxy 4231-75 ft, anhydrite 5214-25 ft, Pettit 5746 ft, Travis Peak 5899 ft, abnd 6226 ft.

EAST TEXAS BORDER COUNTIES WILDCAT

Panola County—Oil Discovery: Roger Lacy's Cameron 1, LaGrone sur, n flank carthage wet gas field, gas-distillate prod in Pettit, 5800 zone, est flow 200,000 gas, dual comp in Travis Peak 6400 zone, 12 bbls hr through condenser in tanks.

EAST TEXAS BORDER COUNTIES OUTPOSTS

Cass County—Kildare Extension: Skelly's Bemis Est. 1, James Taylor sur, 1 mi n prod, 700,000 gas.

Panola County—Carthage Extension: Arkansas-Louisiana Gas Co.'s Pirkle 1, L. Shields sur, 2 mi s prod, perf 6002-28 in Pettit, wet gas, no gge.

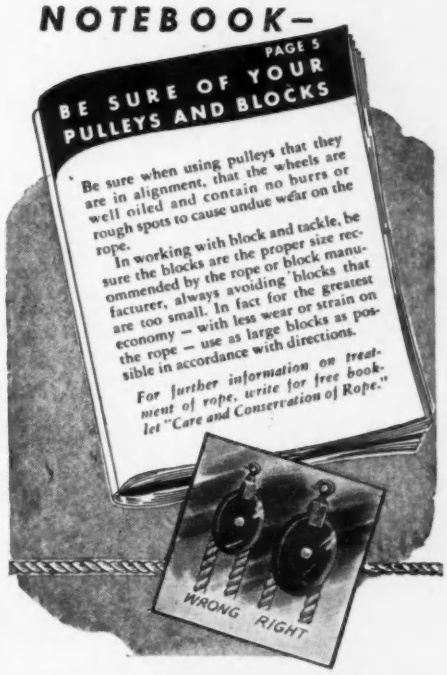
NORTH TEXAS WILDCATS

Archer County—Failures: D. H. Bolin et al's Abercrombie 1-C, 2640 ft snl 1320 ft ewl Wm. Cound sur A-798, sec 2, abnd 1441 ft.

D. H. Bolin et al's Abercrombie-Taylor 1-F, 1320 ft snl on el of blk 13, J. W. Harris subdiv, abnd 1447 ft.

Joe Fish et al's Ikard 1, 1505 ft nsl 200 ft

ROPE CONSERVATION NOTEBOOK—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wel Ikward-Coulson-Hutchinson sur A-756, abnd 943 ft.

Paul B. Scott et al's Abercrombie 1, 1850 ft snl 1580 ft wel blk 102, C. Lydings sur A-254, abnd 1341 ft.

W. E. Stephens et al's Adae 3, 330 ft ewl 660 ft nsl Palo Pinto CSL sec 7, elev 1184 ft, abnd 2009 ft.

Valley Osage Oil Co.'s York 1, 200 ft out nec s½ TE&L Co. sec 1861, abnd 1050 ft.

Cooke County—Failures: A. G. Hill et al's May 1, 4100 ft w 7100 ft n of nwc S. Swartwart sur A-993, but in Alfred Johnson sur A-562, elev 669 ft, Bruhlmeyer sand 5380 ft, abnd 5908 ft.

Northern Ordnance's John Ware 1-A, 467 ft snl 1400 ft wel Wm. Goodnight sur A-414, elev 760 ft, abnd 4770 ft.

Northern Ordnance's S. P. Ware 1, 1660 ft s 330 ft w of swc of Wm. Goodnight sur, but in Wm. Moore sur A-622, elev 724 ft, Ellenburger 4748 ft, abnd 4850 ft.

Haskell County—Failure: Northern Ordnance's Fischer 1, 7300 ft snl 2100 ft wel sec 2, J. Husband sur A-158, abnd 3822 ft.

Jack County—Failure: S. & E. Oil Co.'s Boyd 1, 1280 ft nsl 561 ft ewl of e-500 ac of n-1000 ac of I. N. Wright sur A-898, abnd 2397 ft.

Wichita County—Discovery: Panhandle Ref. Co.'s Madden 1, 1010 ft snl 750 ft wel blk 8, J. A. Kemp subdiv of Wm. Mayer sur A-193, 3 mi sw of West pool, nearest deep prod, elev 1015 ft, Bend 5064 ft, Miss 5291 ft, Ellen 5304 ft, pump 31 bbls 42-gr, 6000 gals acid Strawn perf 4280-4305 ft, td 5351 ft, pb 4327 ft.

NORTH TEXAS NEW PAY TEST

Jack County—Lester Field Shallower Pay: Shell's O. J. Lester 1-B, 2170 ft nsl 1000 ft ewl McKinney-Williams sur A-435, 902 ft n of prolific Miss discovery, elev 1103 ft, Bend 4555 ft, Miss 5547 ft, Ellenburger 5694 ft, flow 249 bbls 44-gr, 2-in, 2000 gals acid Basal Bend congl perf 4906-14, 4968-86 ft, td 5744 ft, pb 5104 ft.

WEST TEXAS WILDCATS

Culberson County—Failures: Standard of Texas' Grisham-Hunter 1, lse, 2, 1834 ft snl 1980 ft wel PSL 16, blk 54, Tsp. 2, elev 3597 ft, Delaware 1980 ft, sand 2020 ft, abnd in Bone Spring black lime 7005 ft.

Standard of Texas' T. P. Land Trust 1-39, c sw nw T&P Ry. 13, blk 59, Tsp. 2, elev 3379 ft, Delaware 2310 ft, sand 2335 ft, abnd 2739 ft.

Crockett County—Failure: Ben Banner et al's Blair 1-45, 597 ft snl 3800 ft wel I&GN 45, blk 1, elev 2115 ft, salt 556 ft, abnd 2002 ft.

Gaines County—Failure: Case-Pemeroy & Co.'s Kuehn 1, c nw ne PSL 11, blk C-44, elev 3236 ft, anhydrite 2240 ft, Yates 3360 ft, frosted grains 3380 ft, brown lime 4440 ft, San Andres 5070 ft, abnd 5489 ft.

Pecos County—Failure: Bryce McCandless et al's University-Shell 1-13, nw nw ne sec 13, blk 26, elev 2628 ft, Yates 740 ft, San Andres 1545 ft, abnd 1712 ft.

Reagan County—Failure: Big Lake Oil Co.'s University 1-D, c e½ ne se sec 10, blk 2, elev 2683 ft, Simpson 9174 ft, Ellenburger 9444 ft, abnd 10,072 ft.

WEST TEXAS OUTPOST

Andrews County—Fullerton Mile West Extension: Anderson-Prichard Oil Corp.'s McCrea 1, c ne ne PSL 1, blk A-48, elev 3311 ft, San Andres 4410 ft, San Angelo 5580 ft, flow 205 bbls 41-gr, 1048/1, ¼-in, 24,000 gals acid, Clear Fork 6829-7211 ft.

WEST CENTRAL TEXAS WILDCATS

Callahan County—Failure: H. G. Daniels, Jr., et al's Hennessy 1, 410 ft snl 330 ft wel S. P. Ry. sec 1, elev 2005 ft, abnd 2024 ft.

Comanche County—Failure: J. E. Whitesides & L. H. Choate's Carroll & Union Central Life Ins. Co. 1, 175 ft out swc sec 80, blk 1, Lampasas CSL sur, abnd 303 ft.

Jones County—Failure: Jones-Stasney and Primo Oil Co.'s King 1, 330 ft nsl 1650 ft ewl sec 14, Wm. Smith sur, elev 1533 ft, abnd 1766 ft.

Taylor County—Failure: Condor Pet. Co.-Grapeland Oil Co.'s Warren 1, 1980 ft out of nwc 1053-ac tr, J. W. Page sur No. 123, elev 1798 ft, abnd 4740 ft.

WEST CENTRAL TEXAS NEW PAY TEST

Jones County—Sayles Shallower Discovery: Lewis Oil Co.'s Sayles 4, 1650 ft ewl 330 ft nsl of 365.3-ac lse, T&P Ry. 44, blk 16, pump 70 bbls 38-gr, Flippen sand 1787-1801 ft, td 2150 ft, pb 1801 ft.

LOWER TEXAS COAST WILDCATS

Hidalgo County—Failure: Texas Co.'s Argyle A. McAllen et al 1, 12,000 fr wl 40,000 fr nl Santa Anita Gr on 35,966-ac lse, abnd 10,604 ft.

Kleberg County—Failure: Sam E. Wilson's Robert Kleberg 1, 467 fr n&el 480-ac lse in sect 10, King addn 3, A Gutierrez Gr, abnd 8359 ft.

SOUTHWEST TEXAS WILDCATS

Duval County—Failure: M. M. Miller & Sons' Leroy Denman 1, 990 fr sl 330 fr nl 80-ac lse, Santos Garcia sur, abnd 5595 ft.

Jim Hogg County—Failure: K. D. Harrison and Chas. Daubert's Yaeger & Stroman 1, 990 fr sel 160-ac lse sw¼ sect 8, L. Vela Gr, abnd 3816 ft.

McMullen County—Failure: S. F. Hurlgut's H. D. Countiss 1, 700 fr nel 5500 fr nel Mrs. Benjamin Hughes sur 836, abnd 5790 ft.

McMullen County—Discovery: Edwin M. Jones' Harry Ezzell C-2, 660 fr el 1980 fr sl sect 54, Ezzell Rch subdvn, 247-ac lse, W. D. Hodges sur, elev 293 ft, dual comp, perf 6439-53 ft, flow 52.91 bbls 53.2-gr, 1,740,000 gas, ¼-in; lower sand 6889 perf 6901-16 ft, flow 127.17 bbls 56-gr, 2,042,000 gas, ¼-in, td 7264 ft.

Starr County—Failure: Sun's Irene Vela 1, 467 fr n&el 87-ac lse, tr 26, P. Longoria porc 94, Juris of Camargo Gr, elev 278 ft, abnd 3976 ft.

Starr County—Discovery: Sun's Manuel Samano 3, 467 fr sl 4133 fr wl 2549 fr wly el 1794-ac lse, sh 79, porc 38-39-40, Juris of Reynosa Gr, elev 340 ft, perf 4301-02, 4302-04 ft, pump 35.97 bbls 36.1-gr, td 4750 ft.

Webb County—Failure: Amigos Oil Co.'s Garcia Heirs 1, 620 fr nl 2045 fr wl sur 58, 252.23-ac lse, abnd 2162 ft.

SOUTH CENTRAL TEXAS WILDCAT DRILLED DEEPER

Lee County—Failure: Cowan & Sorey's S. T. Peeples 2, 660 fr nwly/1 660 fr nely/1 287-ac lse, J. F. Johnson Lge, dry otd in Midway 3608 ft, abnd 4605 ft.

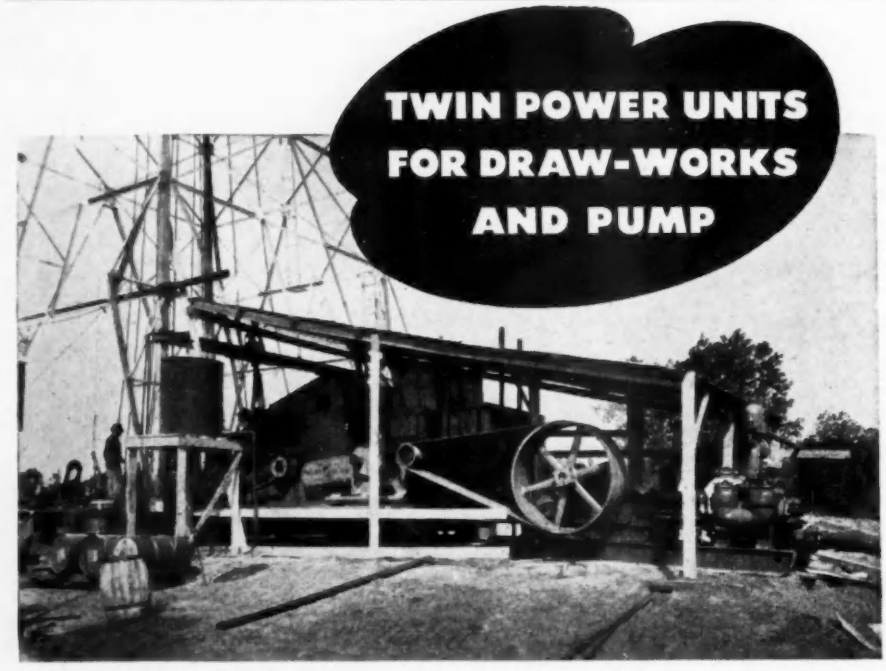
WESTERN CANADA WILDCATS

Central Alberta Plains: Lloydminster: Sparks & Burroughs' Sparky 2, lsd 5 33-49-1w4th, 28 bbls 14-gr, placed on pump, td 1968 ft.

Fabyan: Inland Gas & Oil Company's 2, lsd 15 13-45-8w4th, gas fr, Lower Cretaceous, td 1752 ft.

Southern Alberta Plains—Taber: Mid-Continent Oil & Gas-Standard of B. C.'s Mid-Continent 4, lsd 11 1-8-17w4th, abnd 3273 ft.

STEVE W. BROCK, West Texas district geologist for the Pure Oil Company, Midland, has resigned to accept a similar position with Cities Service Oil Company at Odessa. Karl A. Mygdal, assistant division geologist for Pure Oil Company, has been transferred from Fort Worth to succeed Brock.



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Flexibility in oil field power plant units is essential to efficient use of power. By compounding two or more MURPHY DIESELS, the desired flexibility can be maintained. When peak power is needed, it must be available to assure profitable operation. When only partial power is required, it is wasteful to operate excessively large power units. For peak loads or partial loads, MURPHY DIESELS are rugged, long-lived, dependable...easy to start... economical to operate and maintain...capable of heavy-duty service, but compact, relatively light in weight, and therefore readily portable and adaptable to many jobs...always assuring "more power, more profit". Write for bulletin.

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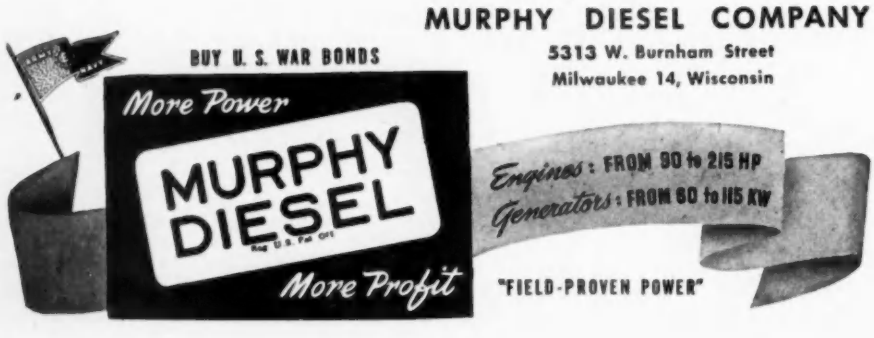

United States Wildcat Starts

ARKANSAS

Calhoun County: Skelly's Gaughan 1, nw nw 3-14-16, spud.

Columbia County: G. H. Vaughan's Bodcaw Oil Co. 1, c nw ne 14-18-23, lcn.

Little River County: H. H. Temple's Dierks Lbr. & Coal Co. 1, c nw sw 30-11-30, lcn.

Ouachita County: Crow Drlg. Co.'s Yarbrough 1, c nw nw 30-15-19, dr 3000 ft.

Skelly's Camden Coal and Clay Co. 1, c se sw 12-12-18, lcn.

Pope County: J. E. Sherod & J. B. Apperson's C. Brinkman 1, ne nw nw 15-9-21, lcn.

CALIFORNIA

Kern County: B. C. Morrison's 1, se se se 4-27-27, McVan area, mim.

Rothschild-Bender's Sheep Springs 1, se sw se 17-29-21, Cymric area, rig.

Los Angeles County: Standard of Cal.'s Ward 3-1, ne nw nw 27-3-16, Aliso Canyon area, rig.

Ventura County: Shell's Rogers B, corehole, sw nw se 22-5-18, Devils Canyon area, spud.

ILLINOIS

Clark County: Isaacson's Blakeman 5, ne se ne 13-9n-14w, dr 984 ft.

Franklin County: Aetna Oil's U. S. Coal & Coke Co. 1, sw nw sw 21-6s-4e, lcn.

Gibson County: Kubat's Sturm 1, ne sw ne 1-4s-10e, lcn.

Hamilton County: Texas Co.'s Watts 1, se se nw 15-3s-6e, dr 1204 ft.

Jefferson County: Skelly's McNabb 1, nw ne se 34-4s-1e, lcn.

Kingwood et al's McKeene 1, 14-4s-4e, lcn.

Lawrence County: Smith et al's Buchanan Cons 1, se se nw 13-2n-12w, lcn.

Madison County: Cassens' Isenberg 1, se se nw 13-6n-8w, dr.

Marion County: Texas Co.'s Carlisle 1, se ne sw 9-3n-3e, lcn.

Sullivan County: Southern Ind. O & R Co.'s Swank 1, ne ne ne 21-6n-10e, lcn.

Vandenburg County: Oil Management's Goforth 1, se se sw 27-7s-10e, dr.

INDIANA

Jackson County: Clore's Lucas 1, nw se 16-6n-4e, lcn.

Wells County: Texas Co.'s Spehleger 1, ne se sw 31-27n-13e, lcn.

KANSAS

Finney County: Carter's Miller 1; nec sw 26-22s-34w, lcn.

Jackson County: Skelly's Meyer 1, nw se sw 13-10s-13e, mirt.

Rice County: Hershey's Major 1, nwc se 3-19s-17w, woc.

Rook's County: Barnsdall's Zanoung 1, sec sw 20-9s-17w, lcn.

Stafford County: Appleman's Russell 1, swc 24-25s-13w, lcn.

KENTUCKY

Henderson County: Schoemaker's Deaton 1, 23-0-23, dr 348 ft.

Ohio County: Dameson et al's Wood 1, 1-L-31, lcn.

NORTH LOUISIANA

Caddo Parish: J. M. Lambert's Self 1, 1140 ft n 830 ft w 12-20-15, lcn.

DeSoto Parish: J. A. Johnson's J. J. Guy 1, 1650 s 1650 w nec 7-11-13, lcn.

Lincoln Parish: J. H. Williams' J. C. Dowling Est. 1, 536 s 596 w nec 29-19-4, lcn.

Southwest Gas Producing Co.'s W. W. Colvin 1, 330 n 330 e c 7-19-2, lcn.

Arkansas-Louisiana Gas Co.'s John E. Mitchell 1, 100 n 150 w c 20-19-2, lcn.

Webster Parish: Carter Oil Co.'s N. P. Davis 1, 660 s 660 w nec 33-18-8, lcn.

SOUTH LOUISIANA

Calcasieu Parish: Magnolia's C. B. Crozier 1, 660 s&w of nec, 13-10s-10w, Lockport area, lcn.

M. P. O'Meara's E Yest et al 1, 330 s&w of nec 28-18s-12w, lcn 8000-ft test.

MICHIGAN

Arenac County: Don F. Rayburn's Trumble 1, nw nw nw 5-19n-3e, rig.

Clare County: Pure Oil Co.'s Holbrook A1, n½ nw ne 12-18n-5w, lcn.

Lake County: Maguire, Inc.'s Thompson 1, s½ se se 24-18n-14w, rig.

Newaygo County: E. L. Bourett's Yob 1, se se ne 16-14n-14w, rig.

Van Buren County: Clapsaddle Drilling Co.'s Sikes 1, n½ se sw 19-4s-16w, dr.

NEW MEXICO

Lea County: Humble's H. A. Keinath-Federal 1, 1980 ft snl 1885 ft ewl 8-21s-38e, lcn 11,000-ft Ellenburger test.

OKLAHOMA

Bryan County: Atlantic's State 1, se sw sw 36-7s-8e, dk.

Creek County: Sinclair-Prairie's Watson 1, nw se ne 16-14n-8e, ru.

Osage County: Norbla Drlg.'s Osage 1, sw sw sw 15-25n-7e, lcn.

Pawnee County: Deep Rock's Dawes 1, sw nw se 32-22n-7e, lcn.

Pittsburg County: Public Service's Horton 1, se nw nw 19-7n-13e, rum.

Pontotoc County: Shaw's Jackson 1, ne ne sw 32-5n-6e, dr 1215 ft.

Washita County: Helmrich & Payne's Compton 1, ne ne nw 31-8n-15w, bldg dk.

Sinclair-Prairie's Bishop 1, ne ne nw 31-8n-19w, lcn.

Carter County: Continental's Dotson 1, sw nw ne 7-2s-3w, lcn.

Creek County: Buckles' Connor 1, sw se ne 17-18n-10e, rum.

Hughes County: Deep Rock et al's Sanders 1, ne se se 17-7n-11e, mi.

Sunray's Harjo 1, se se sw 12-8n-9e, lcn.

Lincoln County: Anderson-Prichard's Elkenburg 1, nw nw se 8-14n-6e, woc.

Seminole County: Winona Oil Co.'s Caesar 1, ne nw ne 12-10n-7e, dr 1972 ft.

NORTH TEXAS

Archer County: Elmer Frerich et al's W. A. Keys 1, 1208 ft wel 980 ft nsl, J. M. Swisher sur A-396, lcn 1150-ft test.

Wayne King and S. W. Petre's Mrs. Carrie Threet 1, 200 ft out sec of w 107-ac tr, Sarah J. Williams sur A-786, lcn 1200-ft test.

John F. O'Donohoe et al's John Conner 1, 200 ft out of sec W. Fitechett sur A-886, lcn 1200-ft test.

Peery and Meredith Dr. Co.'s DeMoss 2, 150 ft ewl 600 ft snl sec 25, blk 5, Clark-Plumb sur, lcn 1500-ft test.

Cooke County: Paul B. Scott et al's A. D. Walterscheid 1, 5847 ft wel 5103 ft snl, Elenor Langford sur A-566, lcn 2800-ft Ellenburger test.

Grayson County: Pure's W. R. Flowers 1, 330 ft out of nec of S-100-ac J. Myers sur A-1443, 2 mi sw Gordonville, lcn 11,000-ft Ellenburger test.

Wichita County: Akin-Dimock and Sloan-Zook Co.'s P. G. Krohn 2, 1650 ft snl 1320 ft ewl blk 289, Waggoner Colony Lands, testing sand 1680-96 ft, td 2058 ft.

Akin-Dimock and Sloan-Zook Co.'s Krohn

Streamlined Weatherford Equipment

Pats. 2,258,052 2,220,237

NEW Streamlined Weatherford Casing Centralizers and Scratchers are ready for jobs where there is little clearance between the pipe and the minimum well bore. Yet this Streamlined equipment does a perfect job at points where the well bore is enlarged. The Centralizer, for instance, can be had with a 3", 5" or 10" collapsible maximum spread, yet on 4¾" pipe it will run in a 5⅝" well bore. Perfect cement jobs depend on equipment with sufficient tolerance to function in the presence of marked variations in the well bore. Weatherford has the answer.

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We will gladly stock your favorite supply store with WEATHERFORD products if it doesn't already have them.

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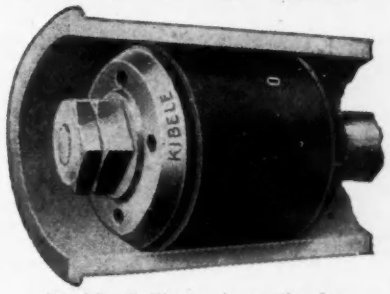
BOILER FEED PISTONS



Double E Piston is made for every type of steam or power-driven pump, and to fit any piston rod or pump liner. Composed of only three pieces, the body, packing ring, and follower plate, the Double E Piston is economical and will last indefinitely. The only wearable part is the packing ring, which can be purchased separately and installed easily and quickly on the original metal parts. These pistons have proved exceptionally successful in handling fluids containing abrasives. These Boiler Feed Pistons have proved to be the most economical pistons for oil fields over the years of service.

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■ FOR SALE: One Thrift Casing Pulling Machine complete with all tools. Mounted on trailer with 10 ply tires. For details write or call Clair M. Phillips, Box 1556, Corpus Christi, Texas. Dial 5951.

One Motorized Pipe or Rod Pulling Machine on Didge, 1936, 1½ Ton Truck.
One set of Power Jacks (100 Ton each) with power pump and high pressure hose and 6000-lb. Gauge Complete.
Four Spiders and Slips to fit pipe sizes 2", 3", 4¼", 4½", 4⅞", 5 3/16", 5⅝", 6¼", 6⅝", 8", 8¼" and 10".
Eight Pairs Casing Elevators.
Four Pairs Rod Elevators, 2" and 3" Tongs.
One Pair of 2" Lay Tongs.
Four Pairs Chain Tongs.
Three Die Nipples, 5⅝", 6¼" and 8".
One Set Casing Cutters—Cut pipe 4⅞", 5 3/16", 5⅝", 6¼" and 6⅝".
One 4⅞" or 5 3/16" Trip Spheres.
One 5⅝" Bulldog Sphere, Two Slip.
One 6⅝" Sphere.
Two 2" Tubing Spheres.
One 4¼" Sphere.
One Combination Sphere 5⅝", 6¼", 8" and 8¼".
One Set Beam Links.
One Tubing Catcher.
Two Tubing Blocks.
Two Sets Jack Sills and Planks.
One 1600-ft. Measuring Line.
300-ft. New ⅝ Non-Spinning Derrick Line.
900-ft. 7/16 Sand Line.

Address: D. D. Hengsteler, West Millgrove, Ohio.

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RECONDITIONED IRON & STEEL
VALVES
LARGE STOCK OF FITTINGS
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HELP WANTED

■ **WANTED: A Petroleum Engineer with field experience, for engineering development work, with a large manufacturer of oil field equipment and materials. Permanent position with good future for right man. In replying state age, education, business background, salary desired, etc. Address: Box 38, c/o The Oil Weekly, Houston, Texas.**

■ Independent Oil Company has opening for Assistant Landman and Attorney, with executive ability. Address: Box 56, c/o The Oil Weekly, Houston, Texas.

■ FORMER ENGINEERING STUDENTS—Major oil company desires applications of persons who are interested in getting into the petroleum industry and who have been engineering or geological students in a reputable school or university. Experience helpful but not essential. Do not apply if employed in essential activity at highest skill. Address: Box 35, c/o The Oil Weekly, Houston, Texas.

■ WANTED: Man serve as District Chief Clerk for large independent operator. Permanent position and postwar opportunity. Salary approximately $300 per month with house at nominal rental. Give age, experience, education, etc. Write Maddox, 601 Dallas National Bank Building, Dallas 1, Texas.

LEASES, DRILLING ACREAGE, ETC.

CUBA—THE COMING OIL COUNTRY

A deep drilling program is underway in CUBA. For information about CUBA and potential oil properties, write Motembo Development Co., P. O. Box 336, Havana, Cuba, or contact O. F. Maddux, 2330 East Central Avenue, Wichita, Kansas.

SITUATIONS WANTED

■ TRANSPORTATION MAN, 43 years old, married, 17 years oil industry experience South America. Capable organizing and managing operations, garage, parts setup, etc. Foreign location preferred. Address: Box 57, c/o The Oil Weekly, Houston, Texas.

NOTICES

■ CAPITAL SEEKERS: Interested in raising $25,000 or more for a legitimate project should write to Amster Leonard, Fox Building, Detroit 1, Michigan.

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■ Expert repairing of plant equipment, overhauling engines, repairing cracked cylinder heads, water jackets, etc. Twenty years experience in oil fields. All work guaranteed. E. E. Kingston, Internal Combustion Engineer, 1657 Westheimer, Houston, Texas. Telephone H-6034.

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■ MAGNETOMETER WANTED. An Askania vertical component magnetometer, preferably with a temperature compensated magnetic system. The Mining Corporation of Canada Limited, 350 Bay Street, Toronto 1, Canada.

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Trading Post Section, THE OIL WEEKLY
P. O. Box 2608 Houston 1, Texas

3, 2150 ft snl 1320 ft ewl blk 289, lcn 1700-ft test.

Young County: Sohio's J. R. Garvey 1, 330 ft nsl 990 ft wel TE&L Co. sec 1856, lcn 5500-ft Ellenburger test.

EAST TEXAS

Hopkins County: Humble's C. D. Nichols 1, 660 ft out of sec of 78-ac of 151.13-ac tr, Isaac Friddle sur, Pickton area, rig for Travis Peak test.

Red River County: Texas Co.'s H. O. Solomon 1, 660 ft wel 3150 ft snl of 472-ac lse, W. E. Edwards sur, lcn deep test.

Van Zandt County: A. F. Richardson et al's Isaac Turner 1, 467 ft snl 575 ft wel 66-ac lse, J. E. Moore sur No. 41, 2 mi s Grand Saline, lcn Woodbine test.

TEXAS PANHANDLE

Hansford County: Phillip's W. Freeman-Lem 1, 1969 ft snl 3234 ft ewl PSL Sec. 1, Blk 1, mim.

WEST TEXAS

Cochran County: Seitz-Comegys & Seitz's Cameron Lumber Co. 1, 660 ft out sec lab 3, lge 86, Greer CSL sur, lcn 6500-ft test.

Tom Green County: L. L. Ingraham et al's M. B. Pulliam 1, c se ne H&TC 12, blk 4, spud 1750-ft test.

Pecos County: Geo. T. Abell et al's Eaton 1-37, 330 ft fr nwl 990 ft fr nel H&TC Ry. 37, blk 3, H&TC Ry. sur, lcn 1800-ft test.

Ward County: Gulf's John Edwards 2-T-B, 330 ft nsl 3696 ft wel James M. Andrews sur No. 6, lcn 6000-ft Clear Fork test.

WEST CENTRAL TEXAS

Brown County: D. H. Brock et al's Craven 2, 660 ft snl 1720 ft ewl subdiv 7, Chas. Messer sur No. 127, lcn 1200-ft cable test.

Callahan County: Northern Ordnance's R. Hennessy 1, 330 ft nsl 990 ft wel BS&F Ry. sec 1, A-538½, lcn 4800-ft test, with combination rig.

Anzac Oil Corp. et al's W. P. Brightwell 1, 1320 ft wel 440 ft snl of 640-ac tr, Victoria CSL sur No. 202, lcn 2550-ft cable test.

Jones County: Lyons & Prentiss' Mrs. Lena Richardson 1, 330 ft out of swc of s-80 ac of n-160 ac of middle 768.2-ac tr, Ambrose Crain sur No. 214, lcn 3500-ft rotary test.

Shackelford County: Roeser-Pendleton's W. P. Newell 1, 1356 ft snl 330 ft ewl E. T. Ry. sec 142, lcn 1700-ft test.

Ungren-Frazier et al's E. T. Reves 1, 330 ft out swc se H&TC 14, blk 3, lcn 3300-ft rotary test to Palo Pinto.

TEXAS GULF COAST

Grimes County: Northern Ordnance's J. M. Quinn C-1, 330 fr s&wl blk 16, 200-ac lse, S. F. Austin sur, lcn 4000-ft test.

Northern Ordnance's J. M. Quinn C-2, 330 fr s&wl blk 18, 200-ac lse, S. F. Austin sur, Yarboro area, lcn 4000-ft test.

Wharton County: Edwin Nielsen et al's Winnie Poole 1, 660 fr ne&se l 2050 fr nwl 114-ac lse, GH&H sur 25, Lisse area, lcn 7200-ft test.

SOUTH CENTRAL TEXAS

Lee County: Seaboard Oil of Delaware's Kissman Est. 1, 467 fr n&wl 312-ac lse, J. Price sur, 2500 fr nl 3000 fr el sur, lcn 5500-ft test.

Atascosa County: Humble's E. J. Pruitt et ux 2740 nw of sel 2000-ac lse 1000 sw at ra fr nel Antonio Estrada sur A-224, sect 53, lcn 7000-test.

Bastrop County: Sohio's R. H. Andrews 1, 330 fr ne&sel w¼ sect 12, Kerr sur A-221, lcn Edwards Lime test.

SOUTHWEST TEXAS

Duval County: Henderson Coquat's South Land Life Insurance Co. C-6, 467 fr sl 1641 fr el 2676-ac lse, Aqua Poquita Gr, blk 5, lcn 6000-ft test.

Jim Hogg County: Harrison & Daubert's W. H. Stroman 2, 330 fr n&wl nw¼ sur 8, El Sordo Gr, lcn 3750-ft test.

McMullen County: Atlantic's Sam Atkinson 1, 663.7 s 660 w of nec nw¼ 80-ac lse, Martha J. Dean sur 13, lcn 8500-ft test.

Quintana Pet. Co.'s South Texas Synd. D-3, 4350 fr nl 2800 fr el sect 1, GB&CNG sur, on 7844.29-ac lse, lcn 6500-ft test.

Starr County: Jones & Minton's Womble & Looney 1, 330 fr w&sl tr 5 357.74-ac lse, porc 81, lcn 5000-ft test.

LOWER TEXAS COAST

Hidalgo County: Texas Co.'s Argyle A. McAllen et al 2, 10,500 e ofwl, 12,225 s of nl 35,966-ac lse, Santa Anita sur, lcn 12,500 ft test.

WYOMING

Albany County: Oklahoma Oil Co.'s UP-Fuller 1, c ne nw 7-15n-75w, North Big Hollow dist, mim Tensleep test.

W. C. SOJOURNER has resigned as superintendent for Hickok & Reynolds to become associated with West Central Drilling Company as superintendent with headquarters at Abilene, Texas.

Squeaks from the Bull Wheel

She Knew Pat

"Be consoled, Mrs. Flaherty. You must just think of Patrick as striking the harp with the angels."

"You don't know Pat, Mrs. Murphy. It would be more like him to be striking the angels with the harp."

Old Enough

It was 2 o'clock in the morning. The writer looked haggard and worn. For twenty-four hours without a pause, he had been working on his new novel.

"Darling," said his wife, "are you coming to bed?"

"No," muttered the busy author. "I've got the pretty girl in the clutches of the villain and I want to get her out."

"How old is the girl?"

"Twenty-two."

"Then put out the light and go to bed. She's old enough to take care of herself."

Child Wit

In the grammar lesson one day the teacher wrote on the blackboard:

"I didn't have no fun at the seaside."

Then she turned around to her pupils and said to one:

"Roland, how should I correct that?"

"Get a boy friend," he answered.

He Was Elsewhere

"Henry, you may tell us about the Caucasian race."

"I didn't see it. I went to the ball game."

A Great Loss

"Jones, can you tell us who built the sphinx?"

"I did know, sir, but I have forgotten."

"How unfortunate. The only man living who knows, and he has forgotten."

Perfect Politeness

"You have heard what the last witness said and yet your evidence is to the contrary. Am I to infer that you wish to throw doubt on her veracity?"

"Not at all. I merely wish to make it clear what a liar I am if she's speaking the truth."

Proof

"And so we find that heat expands things and cold contracts them. Can anyone give me an example of this?"

"The days are longer in summer."

Languages

How is your boy getting along in school?

Very well, especially in languages.

I just got a bill for three courses.

Twenty-five for Latin, fifty for Greek, and one hundred for Scotch.

Sister's Crisis

"Dick is to ask father's consent this afternoon. I feel nervous about it."

"Are you afraid your father won't give his consent?"

"No; I'm afraid Dick won't turn up."

That's All

"Darling, were you faithful while I was away?"

"Oh, George, I was kissed twice."

"By whom?"

"The Navy and the Marines."

Irish Luck

Dinty had been wounded in a riot. After he had been felled with a bullet his enemies had shot him twice as he lay on the ground. At the hospital an anxious friend sought out the attending physician and demanded to know the worst.

"Dinty's badly hurt. There's a hole through his chest, his right shoulder-blade is shattered, and part of his jaw is gone."

"Then poor Dinty can't live!"

"Well, now, I wouldn't say that."

"Then there's a chance?"

"It's more than a chance—it's an incentive. Dinty thinks he knows the man who shot him."

Uncertain Compliment

A Congressman being introduced to a visitor, said "I'm glad to know you, sir. I have heard of you."

"I feel I already know you by reputation."

"Sir, it always makes me feel uncomfortable when a man says that he knows me by reputation."

"How is that, Mr. Congressman? Why should it make you feel uncomfortable?"

"Because, sir, I have two reputations —one here and one back home—and I wonder which reputation he means."

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Notes for the Equipment Buyer and User

Weld Test Machine

AIR REDUCTION SALES COMPANY

Air Reduction Sales Company, 60 East 42nd Street, New York 17, New York, announces a portable weld testing machine that performs three weld tests, including reduced section transverse tension test, guided bend test, and longitudinal all-weld metal tension test.

The machine operates on the principle of the hydraulic jack. A hand operated pump transmits pressure through a hose to the plunger. While the maximum direct load is 40,000 pounds, use of the reduced section specimens permits tests on metals of 150,000 pounds or higher tensile strength.

Jaws for making the transverse tension test and plunger and die for the guided bend test are supplied with the machine. Jaws for the longitudinal all-weld-metal tension (0.505") test are furnished on special order.

Features of the machine include its ability to provide accurate data on tensile strength and ductility of weld specimens as determined by the tests, and its relatively light weight which enables users to perform weld tests on the job.

Flexible Covering

LOVEJOY FLEXIBLE COUPLING COMPANY

Lovejoy Flexible Coupling Company, 5001 W. Lake Street, Chicago 44, has perfected an improved flexible shaft coupling.

Known as L-R Type "C", this coupling effects compact design with over-all smoothness of external surface. An essential feature of the device is the outside steel collar which holds the load cushions in place. An extension of this collar which encircles the coupling, safeguards material and fingers from the heads of the bolts that secure the load cushion retainer. Bolt heads are concealed, yet are conveniently reached when necessity arises.

The coupling is designed for heavy-duty service from 4.60 to 806 horsepower at 100 rpm. Individual free-floating load cushions between the jaws are held in position between an inside steel sleeve and the removable steel collar. Types are available for directly attaching to flywheel, also drum types and others for rapid disassembly. Cushions are of various materials.

Merco Nordstrom-Pittsburgh Shift Salesmen in West

Merco Nordstrom Valve Company and Pittsburgh Equitable Meter Company, Pittsburgh 8, Pennsylvania, announces the following changes in their Pacific Coast offices:

E. H. Adams has been appointed assistant district manager and will operate out of the Pacific Coast district office at Los Angeles. R. L. Ford, Seattle, has been transferred to the Los Angeles district office where he will handle the sale of water meters in Southern California. Gilbert Bowman has been placed in charge of the San Francisco office Frank Tangney has been placed in charge of Pittsburgh's Seattle office. Sales headquarters for the Pacific Coast of both Merco Nordstrom Valve Company and Pittsburgh Equitable Meter Company are located at Los Angeles. The installation of additional oil, gas, gasoline and water meter test, repair and service facilities at the Los Angeles plant to better serve the Pacific Coast area, was announced.

Engstrand Making Trip For Grant Oil Tool Company

Grant Oil Tool Company, Los Angeles, announces that J. A. Engstrand will leave the latter part of June on an extended trip in the interest of the company. Engstrand first will go to Chicago, Washington, New York and Florida, and then fly to Trinidad, Equador, Peru, Venezuela, Colombia and Brazil.

Mud Analysis Logging Service Announced

Seismograph Service Corporation, 709 Kennedy Building, Tulsa, announces that the Hayward Method of Logging Wells by mud analysis, introduced into Venezuela in 1943, is now available in the Western Hemisphere, except the United States and Canada, under the name of Seisdel Well Logging Service.

National Supply Company Will Make Rotary Items at Toledo

National Supply Company has developments now in progress at the Toledo plant which will double the present capacity for manufacture of tool joints, and also provide facilities for production of rotary drilling equipment.

Up to this time the company's production of rotary drilling machinery has been confined to the company's Torrance, California, plant.

According to C. R. Barton, vice president in charge of manufacturing, the doubled facilities for tool joints will be ready by October, while full production of drilling machinery should be reached by January.

Wickwire Spencer Steel Company Announces Two Promotions

Wickwire Spencer Steel Company announces promotion of R. T. Dunlap to vice president in charge of production, and A. G. Bussman to assistant to the president. Dunlap was previously vice president and general superintendent at Buffalo. Bussman previously has been the assistant to the executive vice president. He has been associated with the company since 1930 and was successive-

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ly sales manager of the wire and springs divisions, sales manager of the Buffalo district, and general sales manager.

Grommet Type V-Belts

The B. F. Goodrich Company, Akron, Ohio, has issued a four-page folder on its line of V-belts, featuring information on the recently announced grommet type. In this type of belt, twin cores of endless steel wire twisted on itself form the grommets, which are kept at a uniform distance from the sides of the belt throughout its length.

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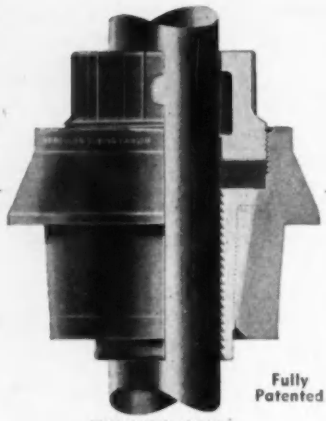

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